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THE COMMERCIAL CAR JOURNAL

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Jos. Maw & Co., Ltd., Winnipeg, Can.
Master Motor Car Co., Chicago., Ill.
Mogul Motor Truck Co., St. Louis, Mo.

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Parcel Post Equipment Co., Grand Rapids, Mich.

Prince Wells Co., Louisville, Ky.
Pennsylvania R.R. Co.

Rowe Motor Mfg. Co., Downingtown, Pa.
Robinson Motor Car Co., Minneapolis, Minn.
Rutenber Motor Co., Marion, Ind.

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H. E. Wilcox Motor Co., Minneapolis, Minn.
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ANDERSON, IND., U. S. A.

THE PUBLISHERS' PERSONAL PAGE

The Trade Pendulum

The pendulum has made the expected swing since the beginning of the war. October's exports showed a trade balance in favor of the United States of more than $60,000,000, an increase of $44,000,000 over September, while in August the balance of trade was against us by $20,000,000, a total increase in exports in two months of more than $80,000,000.

$80,000,000 Trade Balance for U. S.

Among other things, the warring nations still continue to purchase American trucks. Over 4100 trucks have already been sold. The scene of activity at present is the Astor Hotel, New York City, where representatives of many of the largest firms are negotiating for sales. Foreign buyers are dealing in a more direct way with manufacturers, owing to trouble with speculators. American manufacturers are also sending representatives and demonstrating trucks abroad, particularly to London.

Foreign Powers Buying Direct

All of this purchasing of complete cars is directly beneficial to the truck makers and has stimulated business, but also must have a decidedly beneficial influence upon all the parts and accessory people. Increased production is now inevitable in order to care for our normal home demand. Here is the opportunity of the parts maker and the truck maker not tied up with foreign orders.

Effect on the Parts Maker

With truck manufacturers increasing their output to care for the increased home demand, with parts, accessory, and tire makers busy supplying their quota to the increased production, the industry is taking on new life, and what has been regarded as a more or less serious period of depression, has suddenly been converted into the beginning of the greatest production period yet witnessed in the history of the motor truck industry.

The Beginning of the New Truck Era

The Autocar
"Used in Every Line of Business"

Reaches Out for More Business for Laundries

SIX months after they bought their first AUTOCAR Delivery Vehicle, the Club Laundry, Inc., of New York City, bought two more. In placing this repeat order, they said :

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Adams & Swett Cleaning Co., Roxbury, Mass.

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Lewandos, Philadelphia

Eshleman & Craig Co., Philadelphia

THE AUTOCAR COMPANY, ARDMORE, PA.

Established 1897 **MOTOR DELIVERY CAR SPECIALISTS**

The Commercial Car Journal

VOLUME VIII | PHILADELPHIA, NOVEMBER 15, 1914 | NUMBER 3

S. A. E. TO TALK STANDARDS

The 1915 annual meeting of the Society of Automobile Engineers will be held, as previously, in New York City during the motor car show, next January. The propaganda of the meeting contains many subjects for inquiry, discussion, and reports concerning or related to motor trucks.

In brief, the work which will be taken up is as follows:

1. Reduction of the number of stock sizes of roller bearings.
2. Standardization of side-outlet carburetors, if thought advisable.
3. Revision of S. A. E. felloe-band standards with a view to making some sizes thicker, where complaints of their being too thin have been received.
4. Standardization of electric industrial trucks, to be undertaken by T. V. Buckwalter, C. E. Fahlm, J. E. Hale, A. H. Gforer, and H. G. McComb.
5. Submission of data on steel.
6. Standardization of lock washers.
7. Standardization of tap-drill sizes.
8. Formula for road-destructive work of vehicles.

SPACE FOR COMMERCIAL CAR MAKERS AT SHOWS

National Automobile Chamber of Commerce, at a recent meeting held in New York City, perfected arrangements to provide space for commercial vehicle makers at the National Automobile Shows in New York City and Chicago. No trucks will be exhibited, but headquarters will be established where thirty-one makers of trucks, who are members of the Chamber, will be able to meet dealers and those interested in freight-carrying vehicles.

1915 M. T. C. CONVENTION AT SAN FRANCISCO

The Motor Truck Club of America has decided to hold its 1915 convention next summer at San Francisco, in connection with the Exposition. The date will probably be during the latter part of July, although this has not been definitely settled. It is planned to have the motor truck, good roads and railroad conventions all convene at the same time. An exhibition of motor trucks is also being planned.

SHELDEN AXLE COMPANY CHANGES NAME

Sheldon Axle Company, of Wilkes-Barre, Pa., has changed its name to the Sheldon Axle and Spring Company in order to link together in its incorporate name both articles that go to make up the bulk of the Sheldon output. Originally axles were manufactured by this company exclusively, but a few years after moving to Wilkes-Barre a spring plant was installed, and this branch has grown to such an extent that it now exceeds in a measure any other branch of the factory production.

Merchants' & Manufacturers' Association of Milwaukee and Wisconsin Manufacturers' Association have put forward a movement to promote trade extension in South America and other countries not directly affected by the European War. This movement has been joined in by the Stegeman Motor Car Company, Sternberg Motor Truck Company, Garage Equipment Manufacturing Company, Evinrude Motor Company, Wisconsin Motor Manufacturing Company, Milwaukee, and the Aluminum Goods Manufacturing Company, of Manitowoc, and numerous engine-building companies in Wisconsin.

Federal Motor Truck Company, Detroit, Mich., has announced a profit-sharing plan to be instituted on January 1, 1915. Every employee at work on December 31st will receive a share in the company's profits, about 10 per cent. of the worker's yearly salary.

At the Cleveland Automobile Show, held from January 16th to 23rd, in the Wigmore Coliseum, there will be a display of motor trucks as part of the Show itself. A number of applicants for space informed the committee that they wanted to exhibit utility trucks as part of their lines, and this demand has been yielded to. While the commercial section was crowded last year, plans for this year provide ample space for this important feature.

An Advisory Committee of the S. A. E. recently held a meeting in New York City for the purpose of recommending standard practice in the construction of industrial trucks. Various questions on the construction of these trucks were discussed with a view to outlining the work to be done in determining effective standards for an efficient unit. It was made evident that there was opportunity for considerable study in clearing up some of the points involved.

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HESS-BRIGHT MANUFACTURING COMPANY WINS SUIT

United States Circuit Court of Appeals handed down a decision, on October 7th, sustaining the Conrad patent of the Hess-Bright Manufacturing Company in its long suit against Fichtel & Sachs, of Germany, and their exclusive American representatives, the J. S. Bretz Company, of New York City, for infringement. The suit against F. & S. involved only one patent, namely, that covering the article, not the one relating to a method. The uninterrupted ball track or way, however narrow such track, and the overhang of the groove sides, however slight, form the essence of the patent and are so defined by the United States Court. The Hess-Bright Company's patent covers the above features broadly regardless of the method of assemblage or insertion of the balls.

Goodyear Tire & Rubber Company, Akron, Ohio, held its largest convention for salesmen and branch and district managers on Thursday, Friday and Saturday, October 29th, 30th and 31st. The men, upon their arrival, were met by the Reception Committee and band, and were escorted to their hotel, after which they formed for the big parade across the city to the Goodyear plant. On Friday and Saturday there were conferences, and on Friday evening, the crowning feature of the convention took place, which was a banquet to all territorial men and managers. Inspiring addresses were made by president, F. A. Seiberling; vice-president, C. W. Seiberling; assistant treasurer, W. E. Palmer; H. S. Quine, manager of salesmen; W. D. Shilts, C. C. Hopkins and C. H. Carlisle. Assistant secretary, A. F. Osterloh, was toastmaster.

Piggins Brothers Motor Truck Company, Racine, Wis., which went into bankruptcy about a year ago, has been reorganized, and business is now being conducted in its former plant on W. 6th Street. The entire equipment at the time of the bankruptcy was sold to the Badger-Packer Machinery Company, of Milwaukee, but most of this has now been re-purchased by the Piggins interests.

United States Light & Heating Company, Buffalo, N. Y., according to the Protective Committee, announces that it now has on deposit approximately $1,400,000 par value of the $2,500,000 preferred stock outstanding, which equals about 55 per cent. of the issue. It is expected that within a short time this will be brought up to 75 per cent. by additional deposits. About $3,500,000 par value of the $14,000,000 common stock outstanding has been deposited, this being about 25 per cent. of the junior issue.

Arthur Atwater Kent has been awarded, by the City of Philadelphia, the John Scott Legacy Medal and Premium of the Franklin Institute, for the Atwater Kent Unisparker and Ignition System. This medal and premium was bequeathed by John Scott, chemist, of Edinburgh, made in the year 1816, creating an endowment to the City of Philadelphia, directing the interest and dividend to be distributed annually among "ingenious men who make useful inventions." This is believed to be the first time this medal has been awarded to a manufacturer of automobile parts.

VAN DERVOORT TO BE NEW PRESIDENT OF S. A. E.

President W. H. Van Dervoort of the Root & Van Dervoort Engineering Company and the Moline Automobile Company, East Moline, Ill., has been nominated for the presidency of the Society of Automobile Engineers, New York City.

In addition to his experiences as a manufacturer of motor cars and gasoline engines Mr. Van Dervoort was, prior to his connection with the above industries, a professor in the University of Illinois.

The other nominees are: For First Vice-President, Frederick R. Hutton; for Second Vice-President, Joseph A. Anglada; for Treasurer, A. B. Cumner. For Councillors—C. B. Rose, 1915 and 1916; John Wilkinson, 1915 and 1916; W. P. Kennedy, 1915 and 1916; Frank M. Germane, 1915.

S. A. E. Standards Committee Convention

The next meeting of the Standards Committee will be held at New York on November 17, 18 and 19. Meetings of a number of the Divisions of the Standards Committee will be held at the same time as the convention. Among these are the Ball and Roller Bearings Division, Carburetor Fittings Division, Commercial Car Wheels Division, Electric Vehicle Division, Electrical Equipment Division, Iron and Steel Division, Lock Washer Division, Motor Testing Division, Pleasure Car Wheels Division, Research Division, Springs Division, Standards Exchange Division, Truck Standards Division.

Reports from these divisions as well as from other divisions not meeting at the time of the convention, will be submitted at the convention.

COMING AUTOMOBILE SHOWS AT WHICH COMMERCIAL CARS WILL BE EXHIBITED

November 14-21—Providence, R. I. State Armory. R. I. Auto Dealers' Association. Percival S. Clark, Manager, 235 Broad Street.

November 16-21—Spokane, Wash. Automobile Show. Union Terminal Grounds. Spokane Chamber of Commerce. Gordon C. Coball, Secretary.

December—Toledo, Ohio. Toledo Auto Show Company. H. W. Blevins, Manager, care of Blevins Auto Sales Company.

January—Tiffin, Ohio. Auditorium.

January 9-16—Milwaukee, Wis. Auditorium. Milwaukee Auto Dealers' Association. Bart J. Ruddle, Manager, 71 Sentinel Building.

January 16-23—Cleveland, Ohio. Wigmore Coliseum. Cleveland Automobile Show Company. Fred. H. Caley, Manager, Hollenden Hotel.

January 18-23—Rochester, N. Y. Rochester Auto Trades' Association. E. M. Alling, Secretary.

January 30-February 6—Minneapolis, Minn. Armory. Minneapolis Automobile Trade Association. R. B. Simming, Secretary, 707 Andrus Building.

February—Louisville, Ky. Louisville Auto Dealers' Association. P. S. Longest, Secretary, 725 South Third Street.

February—Elmira, N. Y. State Armory. Elmira Auto Club. Frank D. Pratt, Manager, 210 East Water Street.

February—Grand Forks, N. D. Auditorium. Grand Forks Auto Show Association. L. Stinson, Manager.

February—Grand Rapids, Mich. Klingman Furniture Building, Grand Rapids Herald. A. H. Vandenberg, Editor.

February 1-7—St. Joseph, Mo. Auditorium. St. Joseph Automobile Show Association. R. R. Calkins, Manager. German-American Bank Building.

February 8-14—Kansas City, Mo. Convention Hall. Kansas City Motor Car Dealers' Association. E. E. Peake, Secretary, 909 Gloyd Building.

February 15-20—Omaha, Neb. Auditorium. Omaha Auto Show Association. C. G. Powell, Manager, 2119 Farnum Street.

March—Watertown, N. Y. Watertown Automobile Association. Arthur E. Sherwood, Manager, 4-6 Flower Building.

March 6-13—Boston, Mass. Mechanics' Building. Boston Auto Dealers' Association. Chester I. Campbell, Manager, 5 Park Square.

March 15—Cedar Rapids, Ia. Auditorium. Cedar Rapids Auto Dealers' Association. Martin Beck, Manager. First Avenue, West.

April 15-20—Deadwood, S. D. Deadwood Business Club. George H. Kilker, Manager.

NINETY-THREE TRUCK MAKERS REPRESENTED AT THE GET-TOGETHER CONVENTION

An analysis of the 297 registrations at the recent Get-Together Truck Convention showed that the motor truck manufacturers and the accessory makers were well represented, also that there was a goodly representation of dealers. These figures as analyzed by C. E. Stone, general manager of the Club, were as follows:

Representatives of manufacturers	93
Dealers	39
Tire manufacturers	18
Accessory manufacturers	57
Railroads	17
Battery makers	2
Engineers (consulting)	1
Motor Truck Club officers	3
Owners	3
Press	36
Special commissioners	8

The gathering represented sixteen States, the most western cities represented being Los Angeles and San Francisco, the most northern Minneapolis and St. Paul, eastern, Boston, and southern, Mobile, Ala., and Wichita Falls, Tex.

Branches of the Motor Truck Club of America have been organized in Detroit and Buffalo since the convention.

AMERICAN WAR MOTOR TRUCKS MUST BE DEMONSTRATED IN LONDON IS RUMOR

Rumor has it that the British War Office has stated that American motor trucks that are purchased for war purposes must be demonstrated by the manufacturers in London.

Several of the well-known makers, such as the Packard, White and G M C, etc., already have trucks in London in connection with foreign branches.

A. W. Robinson, of the Locomobile Company, recently sailed with one of the new three-ton worm-gear trucks; Mr. Porter, manager of the New York Branch of the Chase Motor Truck Company, of Syracuse, has gone to Europe with sample trucks, and the International Motor Company has sent a man.

H. M. Coale, sales manager of the Autocar Company, Ardmore, Pa., recently sailed for London with samples of Autocar transport wagons, armored cars and officers' roadsters to care for this business.

Activity at the Astor

The Astor Hotel, New York City, at the time of this writing, November 12th, is a miniature truck convention there being so many representatives of the truck makers as well as tire manufacturers present, some of those to be seen were G. Marks, General Manager of the Service Motor Car Company, Wabash, Ind.; John Edwards, of the Bowling Green Motor Car Company, Bowling Green, Ohio; Fred Ehnts, Sales Manager, Dorris Motor Car Company, St. Louis, Mo.; Walter White, of the White Company, Cleveland, Ohio; M. L. Pulcher, Vice-President and General Manager of the Federal Motor Truck Company, Detroit, Mich.; Oscar Stegeman, President of the Stegeman Motor Car Company, Milwaukee, Wis.; C. P. Henderson, Cole Motor Car Company, Indianapolis, Ind.; Mr. Hill, of the Thomas B. Jeffery Company, Kenosha, Wis.; Messrs. Lumis, Taieter & Spank, of the Speedwell Motor Car Company, Dayton, Ohio.

R. G. Sallmons, Vice-President and General Manager and George C. Gordon, Treasurer of the Selden Motor Vehicle Company, Rochester, N. Y.; I. M. Lewis, Treasurer and General Manager of the Bessemer Motor Truck Company, Grove City, Pa., were also present but have gone to Europe with demonstrating trucks; C. W. Martin, of the Goodyear Tire & Rubber Company, Akron, Ohio, and Roy Harris, of the Firestone Tire & Rubber Company, Akron, Ohio; Mr. Sanford, of the Sanford Motor Truck Company, Syracuse, N. Y., and Mr. Denby, of the Denby Motor Truck Company, Detroit, Mich.

The firm of Gorton, Williams & Wigmore, 140 Broadway, New York City, is now purchasing for France. E. G. Keller, 200 5th Avenue, New York City, is buying old tires for Italy; rubber is wanted.

Pacific Motor Coach Company, Los Angeles, Cal., opened its first motor 'bus route from the ferry to the beach.

Street Transfer Company, Florence, S. C., has established a motor baggage and passenger line between the depots and hotels. This line displaces the old horse 'bus line.

MOTOR TRUCK ASSOCIATION, PHILADELPHIA, MONTHLY MEETING

On Wednesday evening, October 21st, about seventy of the members of the association gathered at the Adelphia Hotel, Philadelphia, President Jackson in the chair. The speaker of the evening was Charles Coolidge Parlin, of the Division Commercial Research of the Curtis Publishing Company, who addressed the members on subjects of vital interest to manufacturers and dealers. His talk which was in the form of a resume of the situation, pointing out the future increasing importance of the sales force is extracted herewith.

In the truck business, up to the present time, there has been one great difficulty,—it has been extremely difficult to make any money. I will not say that there are no companies making money,—that of course is not true; but taking the business as a whole, there has been very little money made so far. One of the reasons for this is the expense of service. A man overloads a truck and says he did not. The manufacturer is in a dilemma. If he believes the man, he goes broke trying to furnish service if he does not believe him, however diplomatic he may be in refusing service, the man becomes dissatisfied and spoils his trade by knocking the product.

Other conditions also interfered with the making of money. There has been the evil of price cutting. In price cutting, when one starts there is no bottom because the real satisfaction a man gets out of buying a pleasure vehicle or truck at a lower price is when he whispers to his neighbor that he beat the game by 5 per cent. The next man wants 7 per cent., and so on.

The truck business is very young. Then again it is a small industry and it seems that no manufacturer has turned out a large enough number of trucks to secure a profit on close margin quantity basis. In 1909 there were only 3255 commercial vehicles. Since that time the industry has developed over 1000 per cent. In any industry which increased over 1000 per cent. in 5 years we must expect to find crudities, but with the improvements in manufacture and sale, and with the co-operation which exists among the dealers, there will be a marked improvement in the next 5 years.

At the present time there is a multitude of truck companies. A great many of these are local companies. A group of men get together and form a company. They get plenty of newspaper publicity, have a site of land, sell some stock to friends, and start business. They have one great argument,—"The factory is right here in the city; you can get factory service right at home." They do a good business the first year. Various people have bought stock and orders are placed in goodly numbers. The second year is not so good; it is more difficult to get orders. People interested in the concern ordered the first year, and besides that, the trucks need more service. By the third year the company begins to realize that the argument they used for the establishment of the company is causing their undoing. They are too near to their patrons, and the demand for service is disastrous.

It seems to me that there is little permanent opportunity for local companies, and that the economic advantage lies with the big concerns, whose volume of business makes possible manufacturing on a quantity basis and national selling in sufficient quantities to make the sale of trucks on short margins profitable in every city.

National Influence Rather Than Local Sells Cars

To-day, if you will cross the country and inquire in every city, what is the order of sales of pleasure cars, you will find that in almost every city the order of sales of the leading six or eight cars is the same as the order of the national sales of those companies. That is, the influences that are to-day selling pleasure cars are not local but national. By national influences we mean three:

1. Merit of the product.
2. The strength of the national advertising.
3. The efficiency of the national sales organization.

In the early days of pleasure car selling, the manufacturer's three steps were:

1. Get a good product.
2. Get a retail organization.
3. Get the retail organization to push the product with the consumer.

To-day the three steps are:

1. Get a good product.
2. By national advertising inform the consumer of the strength of the proposition.
3. By the strength of the national advertising secure a sales organization.

Selling Method Key to Success in Truck Business

This same chain of influences is operating to-day in the truck business. The companies that succeed in the truck busines are likely to be those that best master their selling methods.

If you were to make the circuit of a large number of truck salesmen and ask what is the difficulty in selling trucks, they would tell you that the difficulty is not to sell the trucks, but to keep trucks sold. This means that the real difficulty is to sell trucks right, for if they sold right they will remain sold.

A truck makes money only when it is in motion with a load on it; and the proper selling of trucks involves analysis of a man's delivery problem to show him what kind of truck his particular problem calls for, and how many of each weight and of each kind.

A company cannot succeed by simply selling its trucks indiscriminately. The companies that finally succeed in the truck business will be those that most honestly and most efficiently analyze sales distribution problems and recommend honestly exactly that delivery service will produce for any given manufacturer the largest return on his investment. They will be those companies that can tell a man how to put his delivery system on a paying basis, in other words, tell him how many electric cars, how many gasoline cars or how many horses he may need. In that way a man will buy a truck with full confidence in the company from whom he makes the purchase, with a belief that his truck is right and that the price is right, and he will not expect an unreasonable amount of service.

This means that in the selling end there must be a high grade of salesmen, of the student type, who can analyze conditions and present recommendations which will actually work out and stand the acid test of the balance sheet at the end of the year.

Probable Future of the Truck Industry

During the next 5 years there is likely to be a great development in the truck business. It has developed 1000 per cent. in the last 5 years and will doubtless show great gains during the next 5 years. We believe that trucks will be produced on a basis of manufacturing efficiency in which the profits will be sought in close margins on large volume, and that the selling will be done by highly efficient sales organizations backed by national advertising.

Mr. Parlin's talk was followed by some brief remarks by City Statistician Cattell.

T. H. McGiehan, vice-president and general manager of the Motz Tire & Rubber Company, Akron, Ohio, who was a guest, was also called upon and spoke on the co-operation that the truck dealer could give the tire companies.

American Drop Forge Association has been formed in Detroit the purpose of the association being entirely educational and for the uplift of the industry. The following officers were elected: R. R. Ellis, president; Geo. Desautels, vice-president; A. E. Dibble, secretary, and E. B. Horne, treasurer.

Changes and Factory News

Covert Motor Vehicle Company, Lockport, N. Y., manufacturer of transmissions, is erecting $50,000 addition.

Standard Arms Manufacturing Company, of Wilmington, Del., has commenced the manufacture of motor trucks.

Sternberg Manufacturing Company, Milwaukee, Wis., changed its name to Sternberg Motor Truck Company.

New England Truck Company, Fitchburg, Mass., is turning out a 3000-lb. worm-drive motor wagon known as the Netco.

Lord Baltimore Truck Company, of Baltimore, Md., has moved into its new quarters at Bank and 5th Streets, Highlandtown.

West Coast Wagon Company, Tacoma, Wash., expects to soon market a one and a half ton motor wagon fitted with internal gear drive and Continental motor.

Killingly Manufacturing Company, Williamsville, Conn., a subsidiary of the Goodyear Tire & Rubber Company, Akron, Ohio, is to erect a factory for making cotton duck for tires.

Olmstead Gas Tractor Company, of Great Falls, Mont., has taken over the plant formerly occupied by the Curtis Motor Truck Company, of Decatur, Ill., in which gasoline tractors will be manufactured.

Federal Motor Truck Company, Detroit, Mich., maker of Federal trucks, has acquired a controlling interest in the Federal Motor Truck Company, New York City, which is now being operated as a factory branch.

Patterson Rubber Company, Lowell, Mass., manufacturer of vehicle tires, sold its plant, which sale was forced by a stockholder who foreclosed a mortgage. A reorganization of the company is being planned by Boston stockholders.

American Electric Starter Company, Detroit, Mich., has been succeeded by the Dicso Electric Starter Company, capitalized at $60,000. Officers: Jay Johnson, president; Chas. J. Carpenter, vice-president, and T. D. Murton, secretary-treasurer.

Mack Truck Company, of Los Angeles, Cal., which consists of J. A. Stoner and W. M. Thompson, will build a factory branch in that city. The new plant will supply trucks for the territory west of the Rocky Mountains, British Columbia, Hawaii and the Orient.

The Fafnir Bearing Company, New Britain, Conn., who have been selling their goods through the Rhineland Machine Works, who were exclusive sales agents, advise us that their product will hereafter be sold direct from the factory by their own sales force.

Lovell-McConnell Manufacturing Company, of Newark, N. J., has reorganized and enlarged its selling organization. The sales and advertising departments have been merged into one and additional territorial managers have been appointed, which, with other changes, will enable the Klaxon concern to still further co-operate with its distributing jobbers in marketing Klaxon products.

Charlotte Wagon & Auto Company, 26 E. 6th Street, Charlotte, N. C., maker of commercial delivery wagons, automobile truck bodies, etc. T. P. Moore sold his interest to O. V. Hoke and A. K. McLeod. Mr. Hoke will have active charge of office and outside work; Mr. McLeod is vice-president but will take no active part in business. F. A. Owens remains president and general manager.

Personal Items

R. D. Campbell, formerly connected with White Company, in Cleveland, now has charge of the sales of Signal Motor Truck Company, Detroit, Mich.

Laurence Moore has been appointed sales director of the Saxon Motor Company, Detroit, Mich., having supervision of both foreign and domestic sales.

Ernest Coler, advertising manager of the Willys-Overland Company, Toledo, Ohio, has resigned to take a similar position with the Briscoe Motor Company, Jackson, Mich.

Herman G. Farr, chief engineer of the Knox Motors Company, Springfield, Mass., has resigned that position and will open an office in Springfield as a consulting engineer.

Herman L. Wittstein, for the past year supervisor of records for the Knox Motors Company, of Springfield, Mass., has been appointed efficiency engineer of that company.

W. R. Horning has established a service station and consultation bureau at 1020-30 Chestnut Street, Cleveland, Ohio, in all makes of automobile starting and lighting systems.

H. M. Wallis, Jr., secretary and treasurer of the J. I. Case Plow Works, Racine, Wis., has resigned to devote all his time to the development of the Wallis Tractor Company, manufacturing tractors at Cleveland, Ohio.

E. Ralph Estep, former advertising manager of the Packard Motor Car Company, joined the Cheltenham Press, well-known advertising agency and catalog maker in New York City, in which concern he has a stockholding interest.

J. P. Denvir, formerly with Gibney Tire Company, New York City, is now assistant sales manager of the Federal Motor Truck Company, of New York City, now a branch of the Federal Motor Truck Company, of Detroit, Mich.

New Incorporations

Best Service Truck Company, St. Louis, Mo., has been incorporated for the manufacture of motor trucks.

Tatom Carburetor Company, Atlanta, Ga., incorporated with a capitalization of $100,000 to manufacture carburetors.

Denby Motor Truck Sales Company, of Boston, Mass., has been incorporated with capitalization of $10,000 by Walter F. McGill, Albert Williamson and Thos. W. Donalson.

Charter Single Sleeve Motor Company, Chicago, Ill., to manufacture gas and gasoline engines, capital $110,000. Incorporators: W. McKinley, E. O'Hara and H. H. McCarthy.

K-T Lever Spring Company, Inc., Manhattan, N. Y., manufacturing springs for automobiles, carriages, shock absorbers, etc. Capital $50,000. Incorporators; W. F. Cornell, T. Johnson, and S. Gross.

Financial and Legal

Disco Company, Detroit, Mich. Lee E. Joslin, referee in bankruptcy, has announced that a second dividend of 12½ per cent. was paid to all creditors on or about November 14th.

De Laski and Thropp Circular Woven Tire Company, Trenton, N. J., has been granted a decision in favor of its Letters Patent No. 1,011,450, dated December 12, 1911, which covers its tire wrapping machine, and the William R. Thropp & Sons Company, also of Trenton, has been found to be an infringer.

Conventions of Interest to the Trade

The list of conventions given herewith is published each month, so that commercial car manufacturers can communicate with the proper authorities, with the idea of arranging to give lectures, illustrated talks, statistics, etc., to show the advantage of motor trucks in these various lines; also, possibly, to show and demonstrate their cars.

National Conventions

December 14-17—at Chicago, Ill. American Road Builders' Association. E. L. Powers, 150 Nassau Street, New York City, Secretary.

March 1-15, 1915—at Mason City, Iowa. National Creamery Buttermaker's Association. M. H. Meyer, 1011 West Washington Avenue, Madison, Wis., Secretary.

State Conventions and Fairs

November 19-21—at Peekskill, N. Y. Business Men's Carnival held by the Truck Company, in Truck Gymnasium. Mr. Colyer is Chairman of one of the committees in charge.

November 19-26—at Beaumont, Tex. Southeast Texas Fair. F. M. Law, President of Association.

December 1-4—at Des Moines, Iowa. Convention of Iowa Retail Implement and Vehicle Dealers' Association. Commercial Club is interested.

December 3-5—at Newport News, Va. Farmers' Convention and Fair. Address Chamber of Commerce.

December 7-14—at Phoenix, Ariz. American Mining Congress will convene. James F. Callbreath, 711 Cooper Building, Denver, Colo., is interested.

December 8-10—at Oklahoma City, Okla. Hardware and Implement Association Annual Convention. W. B. Porch, of Mustang, Secretary.

December 8-11—at Bangor, Me. Maine Dairymen's Association. Leon S. Menial, of Orono, is Secretary.

December 15-18—at Rochester, N. Y. New York State Dairymen's Association. W. E. Griffith, of Madrid, Secretary.

January 12-15—at Chicago. Illinois Retail Hardware Association. L. D. Nish, of Elgin, Ill., is Secretary.

January 19-21—at Fargo, N. D. Tri-State Grain Growers' Association. Address Commercial Club.

January 26-28—at Waco, Tex. Retail Hardware Association Convention. Henry Marti of Dallas, Secretary.

January 26-29—at Indianapolis, Ind., Retail Hardware Association. M. I. Corey, of Argos, Secretary.

February 9-12—at Omaha, Neb. Nebraska Retail Hardware Association. Nathan Roberts, of Lincoln, Neb., Secretary.

February 9-12—at Saginaw, Mich. Retail Hardware Association Convention and Exhibit will be held in Auditorium. A. J. Scott, of Marine City, Mich., Secretary.

February 16-19—at Cincinnati, Ohio. Retail Hardware Dealers' Association State Convention. Headquarters at new Gibson Hotel. Exhibit at Music Hall. James B. Carson, of Dayton, Secretary.

February 17-19—at Fargo, N. D. Annual Convention of North Dakota Hardware Association. N. C. Barnes, of Grand Forks, is Secretary.

February 19-22—at St. Louis, Mo. Retail Hardware Association and Mississippi Valley Implement and Vehicle Association Annual Convention. F. X. Beeherer, Secretary, 5136 North Broadway.

February 23-25—at Lexington, Ky. Retail Hardware and Stove Dealers' Association to convene. Headquarters are at Phoenix Hotel. J. M. Stone, of Sturgis, Ky., Secretary.

February 23-26—at St. Paul, Minn. Retail Hardware Association of Minnesota. H. O. Roberts, Metropolitan Life Building, Minneapolis, Secretary.

Firemen's Conventions

December 1-3—at Chicago. Annual Convention National Firemen's Association. National Hotel headquarters. Ex-Battalion Chief Bert Fisher, of Chicago, Secretary.

Adams Bros. Truck Company, Findlay, Ohio, is arranging for a complete re-organization, and it now seems that an expensive receivership will be avoided. It is planned to settle with the creditors for 20 per cent. cash and 40 per cent. in stock of the new company for every dollar of claims.

Something New in Designing

By W. LIVINGSTON LARNED

THERE is no intention on the writer's part to be either serious or educational in what follows. But to the members of the Designing Department and the Body Building Section of our own organization these facts are of special moment.

The Big Chief swooped down on us one day to get busy with a design for the N. and K. string of department stores. It was the fanciest order of the year—two thousand delivery wagons, with trucking blood in them—and a model that had some sort of individuality.

Then the Big Chief read one of the letters on the subject allowed in the office to our Mr. Creelman. I can't remember the exact words, but it went something like this: "We would really like to have something distinctive about the bodies of these delivery wagons and trucks. Our investigators are of the opinion that your cars are built right. Now, if in color or shape, or something or other, you can make people say: 'There goes an N. and K. truck,' or 'That's an N. and K. delivery wagon,' we believe we shall be securing a certain amount of accumulative publicity. Most trucks and wagons look pretty much alike See what you can do."

Everybody in the Designing Department had pet ambitions of his own. However, the little episode I am setting down really centers about Jimmy P. Randolph. And this is Jimmy's story.

The Big Chief was responsible for Jimmy's coming into our department. One of the Big Chief's club friends was Jimmy's father and the young gentleman himself had just taken three or four courses in decorative designing, mechanical engineering, architecture, and the like. Nothing cheap about Jimmy. He would jump from the Art Students' League in New York City to the steel testing room of a Detroit automobile factory without even changing gears.

One October morning Jimmy breezed into the big draughting room looking for all the world like a haberdasher's advertisement.

It proved as the days passed that Jimmy, far from being just a dream, was destined not to pass, but to become a stern reality in the Designing Department. You know men who build up manufacturing establishments can go right on doing right things in the right way until old age and indigestion get them, but sons of friends will happen in the best regulated family.

Jimmy would spend hours and hours sketching out in crude form on bits of white paper his conception of how the modern 1916 model runabout should be designed. There was nothing of the hermit crab about Jimmy either. He'd come right out in the open and stand up for creations of his that were about as consistent as trying to put wheels under the United States Fisheries Department.

Nobody treated Jimmy very seriously during those days. Mr. Creelman came to look upon him as he might upon a big blue bottle that had climbed in through an open window and was bumping around the department. The young gentleman consumed miles of blue-print paper, tracing paper, ads and the like. In his own mind, he so revolutionized body building in the automobile business that if his plans had been adopted people would have been riding under the car instead of on top of it.

This brings us up to the morning that the Big Chief exploded the N. and K. bomb about a universal model of individual design for those two thousand or more delivery wagons and trucks. Jimmy literally drank in all of the details of this fat commission and for 5 or 6 days after that he went spraddling and clucking and mussing around the department, with all the disgruntled abandon of a wet hen. He made little diagrams on his cuffs—he made them on the margins of his morning paper—he sketched out most impossible body models on Creelman's pet magazines and came down bright and early, each morning, with packets of additional inspiration. In the meanwhile, headed by Mr. Creelman himself, we were all ambitious to create an acceptable scheme, and, as it was put on a competitive prize basis, the incentive was there to do big things. All of us felt the fever.

Creelman started in religiously with two or three men and suggestions from the folks higher up were introduced from time to time in these very material and very businesslike operations. I assisted, in a measure, and have only to say that the two drawings turned out were thoroughly conservative, thoroughly practical and just the very thing that a big string of department stores might adopt without a quibble. Experience has taught me, in this business, that nine times out of ten when a man asks for "something entirely original and different" he really wants the same old conservative thing. He's afraid to fly in the face of society, tradition and "what has gone before." During those days a hush had settled over not only our department but the entire factory. The "fat order" was enough to light pine torches under even the laggards of the organization. It seemed to be pretty well understood, however, that much depended upon an acceptable body design.

On the morning of the 15th eleven color sketches were neatly passe-partouted, wrapped up for expressing, and the eventful Period of Suspense began. I cannot allow to go unmentioned the 2 or 3 hours occupied in going over the aforementioned sketches. A very stern and select committee had this honor, headed by Mr. Creelman. In the very midst of it Jimmy bobbed upon the scene with the gol darndest color sketch anybody could hope to set eyes upon. It was drawn on a full-size sheet of Steinbach, dolled up with as many pretty final touches as a bridal bouquet, and bore a signature of such manifest importance that no bank president ever wrote his name to paper with more presumptuous display.

As for the design proper—all of us let out a united howl of merriment. This was no dignified presentation of a possible working scheme. This was no body model for truck and wagon. This was little short of Barnum and Bailey at their resplendent best—a monstrously funny combination of flowers and scroll work and gold leaf and gaudy paint and hideous architecture. There should have been a pipe organ in it. We had visions of steam pianos and the scent of circus sawdust filled the air. Brought down to painfully exact description, this is about what Jimmy had put upon paper in the shape of a "plan"; The body of this new car, according to Jimmy, was to be composed for the most part of a gigantic sunflower, the top being very ornate yellow and gold, while the big petals splashed down in bulbous fashion on all sides. There were knots of sunflowers here and there festooned around, queer effeminate ribbons and all in all it represented, as far as we were concerned, the summit of incredibly bad taste. Where the department and its individual members had adhered pretty closely to straight formal lines and coach-builder tactics, and where Mr. Creelman himself had made color combinations, the only innovation, Jimmy had jumped clean out of the basket, executed a couple of mental handsprings and landed on the scene of action with something about as distinctive as a South American ant eater.

"For the love of Billiken!" Mr. Creelman gasped, turning to the mild-eyed Jimmy, "we can't submit anything like this. It's been a bad season for side shows anyway. You must have been mixed on your instructions, Mr. Randolph. This model was to be used right around the streets of the big cities. We weren't trying to scheme out anything to put on exhibition at the local museums. What is that infernal thing anyhow?"

A moment later the Big Chief called Creelman aside and the two stood whispering by a window for a minute or so. The Big Chief was poking Creelman in the chest with a rigid index finger and Creelman was first surprised and then considerably amused, judging by the expression on his sallow face. Creelman joined the party in a few minutes and made public restitution to our mutual friend Jimmy. "It has been decided," he said, lowering his voice and rubbing off his eyeglasses with his pocket handkerchief, "ahem—ahem—it has been decided to permit Mr. Randolph's design to go forward to the client, with the others. Our president believes that it is just as well to have variety." Every day for a week the designing and draughting departments had more fun at Jimmy's expense than if he were a whole barnstorming burlesque troupe super-condensed. When he came in mornings nobody would look up at all, but it was more than likely that a thin voice would pipe from among the innumerable desks: "Strike up the band, here's the monkey wagon now." But that sort of stuff never touched Jimmy for a single minute. He

filled in his usual time making cranky sketches and fool suggestions, as if there was no such thing as sarcasm in his sunny world.

And then everything happened at once—

A formal blue order slip and office memoranda reached the desk of Mr. Creelman. One by one all of us read it and a different sort of a silence now brooded over our department—a silence made up of chagrin, embarrassment, double-edged anger, amazement, and finally disgust. It's unnecessary to repeat here all of that memorandum but a part of it, in effect, ran something like this:

"* * * And while we appreciate your desire to please us in this matter and while the actual number of sketches submitted was gratifying to our Mr. Marks, and the committee, we are frank in stating that, for the most part, these designs were extremely commonplace.

"As we stated, initially, what we wanted was marked individuality, etc., etc. Under separate cover we are returning ten of these designs. It is with pleasure we are able to state that the sketch suggesting the use of our Sunflower trademark in a novel body arangement, has met with the universal approval of the committee. It comes nearer our ideas in the matter than any of the others and certainly displays an ingenuity and imagination not evidenced by the others. We are very proud of the Sunflower trademark, and, as you doubtless know, this symbol was first thought out and used by Mr. Mark's father nearly fifty years ago.

"With a few changes we believe this design will be O.K., and we will formally pass upon it the early part of the current week."

* * *

All of which goes to show that you can't always sometimes tell.

COMMERCIAL CARS TO HAVE REPRESENTATIVES AT NEW YORK AND CHICAGO SHOWS

At a meeting of the Board of Directors of the National Automobile Chamber of Commerce, on November 4th, plans were perfected to provide space for commercial car makers at the National Automobile Shows at New York and Chicago. It was agreed that no trucks shall be exhibited but that headquarters will be established in the automobile division where the thirty-one commercial car manufacturers in the chamber could meet dealers and those interested in freight-carrying vehicles.

The New York Show will be held in the New Grand Central Palace, January 2 to 9, 1915. The show in Chicago will be held in the Coliseum and First Regiment Armory from January 23rd to 30th. S. A. Miles, 7 E. 42d Street, New York City, is the manager of both shows.

Electric trucks.—A manufacturer's agent in Canada advises an American consul that he desires to be put in touch with dealers in and manufacturers of electric auto trucks with a view to representing a leading truck in his district. Those interested should write the Bureau of Foreign and Domestic Commerce, Washington, mentioning file No. 14341.

Personal Items—Retail

A. S. Robinson, manager of Los Angeles KisselKar branch, has resigned.

Robert Atkinson has become sales manager of Seattle, Wash., branch of White Company.

F. R. Bump succeeds Hanson Robinson in management of Studebaker agency, New York City.

Frank E. Titus, assistant manager of Buffalo branch of B. F. Goodrich Company, is now manager of Pittsburgh branch.

F. N. Dalton, traveling auditor of Studebaker Corporation, is now assistant manager of Studebaker Los Angeles branch.

W. Irvine Pickling, for 4 years manager of the R. & L. Company, New York City, Garford truck distributors, has resigned.

T. G. Woods, formerly connected with White Company in Boston and Providence, is now commercial sales manager of same company in New Haven, Conn.

Tom Wilkenson, formerly manager of San Francisco retail branch of United States Tire Company, is now manager of Los Angeles branch of same company.

V. V. Green, who formerly had charge of the machinery department of the Michigan State Fair, now has the representation of the Republic motor truck in Detroit and vicinity.

C. A. Dunham, formerly manager of Pittsburgh branch of B. F. Goodrich Company, is now manager of Cleveland branch. He is succeeded in Pittsburgh by F. E. Titus, formerly of Buffalo.

R. W. White, formerly manager of Columbus branch of Goodyear Tire & Rubber Company, has become manager of Chicago branch. W. W. Magil succeeds him in management of Columbus branch.

H. E. Waring, for a number of years connected with Pierce-Arrow Truck Sales Department, at Buffalo, has charge of sales of this truck for the Weaver-Brownlee Company, 1821 E. 13th Street, Cleveland, Ohio.

Don Johnson, in charge of Toronto branch of Stewart-Warner Speedometer Company, has been transferred to San Francisco, to fill position vacated by Wm. R. Johnston, now Pacific coast representative of the Lovell-McConnell Company.

E. E. Gerlinger, of Portland, Ore., northwestern distributor of the Federal Motor Truck Company, Detroit, Mich., has been awarded a prize by the factory for doing the largest percentage of business of any American agent for the month of August.

Jas. E. Westrich, well known among commercial car men in St. Louis, has been appointed manager of St. Louis branch of H. E. Wilcox Motor Company, succeeding Fred. E. Hole, who was transferred to Minneapolis to take executive position with same company.

The number of motor trucks in Bombay, India, has impelled the government to pass some very peculiar regulations regarding their operation on public docks. One is that trucks shall not be operated any faster than 10 m.p.h., and that vehicles must not be left unattended; another requirement is that only electric ignition is to be used, which suggests that some very antique machines of the hot tube ignition type are still used. Apparently motor trucks have not enjoyed a great freedom of movement in the past, and the relief from certain position prohibitions still impose very unusual conditions.

New Agencies and Changes

Newell Motor Car Company, 304 N. 12th Street, St. Louis, Mo., moved to 306-08 N. 12th Street.

Studebaker Corporation, 443-46 Broadway, New York City, moved to Broadway and 56th Street.

Otis Williamson, Chamber of Commerce Building, Columbus, Ohio, has the agency for the Mais truck.

Buffalo KisselKar Company, Buffalo, N. Y., has changed its name to the Milson Motor Sales Corporation.

Golden West Motor Company, Sacramento, Cal., is manufacturing a new style four-wheel drive motor wagons.

General Motors Truck Company's Boston branch is now housed in one building, salesroom and office having been moved from Boylston Street to 944 Massachusetts Avenue.

Arthur H. Hertz, manager of commercial car department of the Hawkins Motor Car Company, Spokane, Wash., has taken the agency for the Signal truck for the Inland Empire and Western Montana, and is about to open an exclusive truck salesroom and service department, under the name of the Signal Truck Company.

Weaver-Twelvetree Company, 1821 E. 13th Street, N. E., Cleveland, Ohio, has been succeeded by Weaver-Brownlee Company. Mr. Brownlee, for sometime connected with the Philadelphia Pierce-Arrow agency, has bought Mr. Twelvetree's interest, and is now vice-president, with charge of Pierce-Arrow pleasure car sales.

Franklin Square Garage, 3 Allen Court, Franklin Sq., Worcester, Mass., has closed owing to Massachusetts fire laws. F. S. Howard, proprietor, has moved to 746 Main Street, where pleasure cars and trucks will be sold. A service station will be erected in rear of this address. Name of company will be F. S. Howard Motor Car Company.

American Locomotive Company has announced that it has discontinued the operation of its automobile service station on Jackson Avenue, Long Island City, having turned it over to the International Motor Company, and any Alco vehicles in New York and vicinity requiring parts will obtain them at the service station of the International Motor Company, West End Avenue and 64th Street, New York City.

Koehler, H. J., Sporting Goods Company, 1709 Broadway, New York City, has discontinued selling pleasure cars, having decided to concentrate its efforts in the marketing of the Koehler one-ton truck. The distribution of the Grant pleasure car by the Koehler Company has been discontinued, and the Grant agents, heretofore operating under the Koehler Company, shall continue selling the Grant as direct factory representatives. H. J. Koehler, however, retains his full stock holdings in the Grant Motor Company, Findlay, Ohio, continuing in his capacity of vice-president and director.

Firestone Tire & Rubber Company, Akron, Ohio, opened a branch in Kansas City, Kans. Heretofore the business in Kansas and Oklahoma has been carried on from the St. Louis branch.

Saxon Motor Company, Detroit, Mich., has established a branch at 620 Commonwealth Avenue, Boston, Mass., in charge of F. S. Sumner.

The Street Cleaning Department, of Kansas City, Mo., is using a three-ton Kelly truck.

THE COMMERCIAL CAR JOURNAL

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Known bondholders, mortgagees, and other security holders, holding one per cent or more of total amount of bonds, mortgages, or other securities:
NONE.

(Signed) C. A. MUSSELMAN, Business Manager.

Sworn to and subscribed before me this 18th day of September, 1914.
(Signed) HARRY SMITH, Notary Public.
(SEAL) (My commission expires February 21, 1915.)

Note:—In regard to Section 2 of the Act mentioned above, the Chilton Company does not accept payment, directly or indirectly, for any editorial or other matter printed as news.

WAR, THE HORSE AND THE TRUCK

WE HAVE pointed out already in these columns the many ways in which the European War has increased the sale of commercial cars, but one feature has not been prominently brought to notice. We refer to the scarcity of horses which will ultimately result owing to the European demand for cavalry and draft animals.

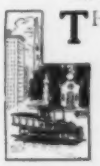
England alone is in the market for ten thousand head of horses at prices ranging from four hundred dollars to six hundred dollars. It is claimed that up to the present time nearly fifty thousand horses have been ordered from the United States. This naturally has resulted in a scarcity of suitable draft animals and a coincident rise in their value.

The price of horse feed has also been going higher; oats have increased 11 per cent. in 5 years, corn has increased 16 per cent. in the same time, while hay has jumped 24 per cent.

It must also be borne in mind that horses are being destroyed in Europe as well as trucks, and there will probably continue to be a strong demand for them until sometime after war ceases. As it takes 5 years to bring a horse to the serviceable age, there is every reason to believe that the price of horses will remain high or increase.

All of these facts are to the advantage of the motor-driven vehicle, and if the manufacturers and agents of the country make proper use of such data, increased sales of trucks at home should result.

UNFEATURED TRUCK ADVANTAGES



THE average truck salesman in approaching the prospective purchaser, bases his plea largely on the economy of the truck. The broad-minded salesman features as well, the numerous advantages which result in any business from the use of motor-driven trucks; in fact, there are some very successful users who would not, in reality could not, get along without trucks even if the trucks cost just as much as the horses. Why do they use them? Because of those other advantages which come as a direct consequence of their use. These advantages are numerous, an extension of business, greater speed, less handling of goods, higher class men in the delivery department and more satisfied customers. These are always featured by high-class salesmen, and almost as invariably overlooked by the mediocre man.

We wish to mention but one of these at this time and one that is perhaps more overlooked than any other. In almost all present installations horses are still used in the same business. All-motor installations are comparatively rare, although the percentage is increasing every day. Introduction of motor vehicles into the service invariably results in a saving of the horses. All the long, hard drills are covered by motors, the horses are saved, they are given the short, comparatively easy routes within a moderate radius. No longer are they sent on the all-day twenty-mile jaunt, with a layover at night, and a repetition of the same back-breaking trip the next day, with a rest of at least a day to get back into condition again.

In snow and ice the trucks are made to do overtime and again the horses are relieved of the killing work. In excessive heat they are kept under cover, while the truck does all the work.

This is almost always true in any delivery service and it will be found that the horses, after the introduction of motor vehicles, are kept in the pink of condition, their efficiency greatly increased, and their length of life in service prolonged, to say nothing of their fine appearance, which, in certain classes of service, is a distinct asset. Due to their splendid condition, the fact that they are not overworked and that they are not exposed to the extremes of heat and cold, reduces the veterinary and shoeing bills to a very considerable extent. In how many cases is this saving ever credited to the truck?

This is only one feature which comes as a consequence of the use of commercial cars. It has its importance, and should not be overlooked.

SPECIAL FEATURES OF THE DECEMBER DEALERS' NUMBER

WE WISH to call attention to the next issue of *The Commercial Car Journal*, which will be without exception the most interesting issue of the year, inasmuch as it will be brimful of special information to the dealer.

There will be numerous stories, editorials, etc., showing manufacturers why it is necessary to handle trucks through dealers, with personal articles from prominent manufacturers who have become successful by the aid of the dealer. Various problems which every day confront the dealer will be analyzed, and suggestions given and experiences cited as to the best manner of overcoming them. There will be stories of the best methods of merchandising; standardizing product; suggestions for co-operative dealers' associations; assistance to drivers; articles on dealers' repair departments; service stations and on branch houses, as compared with a large number of dealers.

Steel and Rubber Markets

Steel Prices Still Declining

At the time of this writing the United States Steel Corporation is operating between 36 and 37 per cent. ingot capacity. During the month of October mills have had orders equal to one-fourth capacity.

Quotations on November 10th were:

STEEL PRODUCTS PRICES

Bessemer steel, per ton, mill	18 50	a 19 50
Open hearth, per ton, mill	18 50	a 19 50
Sheet bars, per ton	19 50	a 20 50
Steel bars, soft base, half ex. tidewater	1 21	a 1 26

The above prices are at tidewater in carloads and larger lots. For quantities less than 2000 lbs., but not under 1000 lbs., $2 per ton additional is charged, and less than 1000 lbs., $8 per ton additional.

SHEETS

The following prices are for 100-bundle lots and over f. o. b. mill; smaller lots $2 per ton higher.

Gauge—	Black.	Galvanized.	Gauge—	Black.	Galvanized.
Nos. 22 & 24	1 70	2 40	No. 28	1 85	2 85
Nos. 25 & 26	1 75	2 50	No. 29	1 90	3 00
No. 27	1 80	2 70	No. 30	1 95	3 15

IRON AND STEEL AT PITTSBURGH

Bessemer iron	14 55	a 14 70
Bessemer steel, f. o. b. Pittsburgh	18 50	a 19 50
Muck bars	28 00	a .....
Skelp, grooved steel	.....	a 1 15
Skelp, grooved iron	1 50	a .....
Ferro-manganese (80 per cent.), seaboard	60 00	a 68 00
Steel, melting scrap	10 00	a 10 25
Steel bars	1 05	a 1 10
Black sheets, 28-gauge	1 85	a 1 90
Galvanized sheets, 28-gauge	2 85	a 2 90
Blue annealed, 10-gauge	1 35	a 1 40
Tank plates, ¾ and heavier	1 05	a 1 10

Crude Rubber About the Same

Prices are slightly in advance of last month's, crude rubber being quoted 65 a 66 on November 10th. Trading is quiet.

Up-River—			Balata, sh't	55	a ..
Fine	65	a 66	Ciudad, b'k	..	a ..
Coarse	47	a 48	Trinidad, b'k	Nominal	
Island—			**Africans—**		
Fine	50	a 52	Massai, red	..	a ..
Coarse	28	a 29	Red C'go	Nominal	
Cameta	29	a 30	B'k C'go	..	a ..
Caucho Ball—			**Soudan—**		
Upper	44	a 45	Niggers	Nominal	
Lower	42	a 43	Gambia, prime	..	a ..
Centrals—			**East India—**		
Corinto	40	a 41	Smk, sh'ts	66½	a 67
Esmeralda	40	a 41	Ceylon, bls & sh'ts	64	a 65
Guatemala, slabs	35	a 37	Pale crepe	65	a 65½
Mexican—			**Pontianac—**		
Scrap	39	a ..	P'me plantation	6	a ..
Strips and scrap	38	a 40	Palembang	6	a ..
Guayule	..	a ..			

DOMESTIC SCRAP RUBBER

Boots and shoes	7⅛	a 7¼
Tires—Automobile	5	a ...

THOSE WHO ARE BUYING AMERICAN TRUCKS FOR EXPORT TO EUROPE

For Great Britain:—

H. G. BURFORD, M.I., Mech.E., M.I.A.E., Mgr. Director Automobile Consolidated Alliance, Ltd., 1 Albemarle St., London, W. American Address: Chipman, Limited, 8-10 Bridge St., New York.

MAJOR GENERAL HUGHES, Commander in Chief of Militia and Defense, Ottawa, Canada.

For Russia:—

GASTON WILLIAMS & WIGMORE, 140 Broadway, N. Y.
COLONEL NICOLI GOLIJOSRKI, Vanderbilt Hotel, New York.

For France:—

CAPT. LARFAILLAUX, Head of French Military Commission.

W. OWEN THOMAS, 210 W. 44th St., New York City, with Thomas & Thomas, has been selected by the allies to act as consulting engineer to investigate financial conditions of manufacturers and mechanical features of the trucks.

EXPORTERS OF NEW YORK CITY WHO ARE HANDLING AUTOMOBILES

Chas. L. Wilson, 271 Broadway.
Utilities Manufacturing Company, 18 Broadway.
Universal Trading Company, 171 Broadway.
H. Spencer Co., 128 Water Street.
J. E. Sitterley, 47 Broadway.
Russo-American Commercial Co., Inc., 109 Broad Street.
F. Rosenstern & Co., P. O. Box 1821.
F. Rosenstern & Co., P. O. Box 1821, Attention of A. L. McCloskey.
Pancorvo Brothers, 17 Battery Place.
G. Ph Nieder, 29 Broadway.
Melchior Armstrong & Dessau, 116 Broad Street.
Kluyskens & Eisler, 112 W. 42d St.
Grevatt Brothers, 136 Liberty Street.
N. Z. Graves Company, 161-63 Water Street.
Charles A. Foster, 59 Pearl Street.
Charles B. Corwin, 15-25 Whitehall Street.
Carr Brothers, 32 Broadway.
Manuel & Caragol & Son, 127-29 Water Street.
Robert M. Lockwood, 18 Broadway.
Ansorge Export Company, 684 Broadway.
Directorio Luso-Americano or Spanish-American Directory, 320 Broadway.
Guiterman-Rosenfeld & Co., 35 S. William Street.
Morrison & Co., 17 State Street.
Arkell & Douglas, Inc., 22 Exchange Place.
John D. Williams & Co., 2 Rector Street.
Downes & Company, Inc., 102-104 Fulton Street.
Gillespie Brothers & Company, 11 Broadway.
W. Bolus & Company, Ltd., 2 and 4 Stone Street.
General Motors Export Company, 11 Broadway.
Markt & Schaffer Company, 193-195 West Street.
Melchior, Armstrong & Dessau, 116 Broad Street.

PARTIAL LIST OF TRUCKS SOLD TO EUROPE

To Gt Britain, 1000 Autocars	**To France - 797 Packards**
" " - 131 Whites	**" " - 200 Pierces**
To Russia - 180 Packards	**" " - 150 Jefferys**
" " - 45 Garfords	**" " - 150 Reos**
To France - 750 Whites	**To Greece - 50 KisselKars**
" " - 340 Kellys	**To Belgium, 300 Overlands**

Hilly Pittsburgh Rapidly Being Motorized

Some Cost Figures — Examples of Efficient Methods Four-Legged Vans

PITTSBURGH is without question one of the hilliest sections of our country in which regular house to house deliveries are being made by motor trucks. In general, the pavements are very rough, being largely cobblestones. It is said that they were purposely made rough so the horses could dig their feet in and prevent themselves from slipping downhill. It is certainly very hard on the trucks in use, particularly on the tires, which are cut and ground by the vehicles slipping downhill with the brakes set, in fact going down the hills of Pittsburgh is a more difficult experience than going up them, and is much more dreaded by the drivers.

Few Accidents Due to Hills

Being such a hilly section one would naturally expect a large number of accidents due to this cause. However, a talk with the Massachusetts Bonding Insurance Company in connection with insurance on trucks in Pittsburgh, reveals the fact that out of one thousand accidents only two were caused by hills, the rest of them occurring on the level. This is accounted for by the insurance company by the fact that the drivers are much more careless when driving on the level than when on the steep hills.

In spite of the difficulties of delivery, Pittsburgh is a good selling point, and the agents are rapidly motorizing the delivery of the city.

Kaufman & Baer, one of the largest department stores, is a large user of trucks, having an exclusive fleet of Whites.

Not only the large stores, but smaller users have their equipment motorized, and even single truck users are getting satisfactory service from their vehicles. All agree that they could not again go back to the old system, with horses as the sole means of delivery. For example, take Dauler, Close & Johns, the well-known furniture dealers. About a year ago, in November, this firm put in service a Lippard-Stewart fitted with pneumatics on the front wheels and solids on the rear. The tire equipment is mentioned, as in this instance the solid tires have given more trouble than the pneumatics. The truck is not overloaded owing to the fact that the goods are as a rule bulky, and the special body is 5 ft. by 12 ft., and does not have capacity sufficient to overload it. It is of the open type, with side curtains and top, as shown herewith.

Pneumatics on Front, Solids on Rear

This Lippard-Stewart truck, of Dauler, Close & Johns, has displaced more than two teams, and opened up new territory in distant and hilly sections surrounding Pittsburgh.

No cost figures have been kept, but the owners are well satisfied, and state that the truck is displacing more than two teams. It frequently makes trips to East Sewickley and delivers to many points in this vicinity, showing on the round trip from 50 to 60 miles, and this is done in a little over half a day. As usual, many bad hills have to be negotiated. With horses, if this point was ever reached, it not only took all day, but they had to be laid up at night, and could not be used the next day.

The driver is a man who is familiar with the furniture business, who was developed to the point of not only driving, but of caring for the vehicle. He takes pride in it, and has shown mechanical ability. Ordinary chauffeurs are not satisfactory, as they do not understand loading or handling furniture. The company garages its own vehicle, and in the year of its use has had no serious item of expense.

A converted Oldsmobile is also used to assist in the work of delivering. Horses have been done away with except for one team which hauls freight from the yards to the store.

Funeral Directors Find Lippard-Stewarts Valuable

Automobile funerals are becoming more and more the custom, and cemeteries are further removed from the center of population. This is true in Pittsburgh to a notable degree, in fact some of the cemeteries are in very inaccessible places, with narrow, unpaved roads on hillsides as the only means of reaching them.

James Lowrie & Sons, funeral directors, have been using Lippard-Stewart trucks for three years. One of these early vehicles was recently turned in for the latest type of casket wagon, which is herewith illustrated. This car of course has a special body, mahogany finish throughout. The car takes the place of three wagons, two single and one double, or four horses. All long trips are cared for by the truck. A Cunningham, an Abbott-Detroit, and an Austin, all fitted with pleasure bodies, are also used for business purposes. Thirteen horses are used for funeral carriages. It is the intention of this firm to motorize the entire equipment just as soon as possible, and plans are now being made to add a hearse and an eight-passenger limousine for funeral purposes. Before the automobiles were purchased over forty horses were in service.

The trip to Rosedale Cemetery is frequently made, the truck going up roads

Lippard-Stewart Casket Wagon

This special panel-body job has been found to be a money saver, by James Lowrie & Sons, of Pittsburgh, especially for long-distance hauling over the Pittsburgh hills. It takes the place of one double and two single wagons and four horses.

where horses are not used, in fact people prefer to walk as they are afraid to ride. The truck is fitted with pneumatic tires and in wintertime with chains, and no unusual difficulty has been experienced in the use of the truck during the snowy season.

When asked if they could do without motor vehicles, the statement was made that it would be impossible to go back to the old methods and still retain the business they were now doing.

Advantages of Trucks

Long distance runs are more frequent than one might suppose and prove the economy of the truck. The bodies of those who have died of contagious diseases are not permitted in public carriers without first being thoroughly embalmed at considerable expense. By automobile it is not necessary to take the body upon trains or upon other vehicles, as the truck goes directly to the house.

Trips of this kind have been made by this firm as far as Beaver and return, about 55 miles the round trip.

The cars are fitted with a black cross on the radiator cap and are given by the traffic policemen almost the same privileges as cars bearing the red cross of the doctors.

No definite cost records have been kept recently, but the users are sure that the trucks are saving them money, and are so well pleased with their performance that the entire equipment will be motorized as soon as possible.

Floral Company Uses Large Truck

A two-ton Lange truck has now been 6 months in the service of the Blind Floral Company, this being the only motor-driven vehicle used. It is fitted with two different bodies, one a conventional panel body especially for the delivery of flowers and set pieces, and the other an open body which is suitable for hauling boxed plants for shipment to foreign parts. It is doing the work at the present time of two two-horse wagons, which have been sold, and the owners state that the deliveries are much more prompt and satisfactory. They even mentioned that additional business had come to them through the young people who had noticed their stylish outfit on the street, and mentioned it at the table at home, and new customers were thus secured.

The truck proved invaluable, especially during the spring business or planting time, when prompt deliveries are most important. This company states that it could not have cared for the business without the truck.

City Vehicles

The importance which motor-driven vehicles are assuming in affairs municipal is shown by the fact that the city of Pittsburgh has recently established a "Department of Automobiles," which is under the Department of the Mayor. Although the city has been using police patrols, ambulances and wagons for hauling for several years, it has but recently recognized that this use of motor-driven vehicles has grown to such an extent that a separate department is necessary. About forty-four cars of all types and sizes as well as seventeen motorcycles for patrols are in use. These include Lippard-Stewarts, Whites, Garfords and Alcos.

Since the new department has been created the expense of operation has been cut down two-thirds, and the efficiency increased. The city is divided into twenty-three divisions, and with most of the cars stationed at a central garage and a few at some outlying smaller garages which are more convenient to the most distant districts. A requisition form is provided upon which an application for a car can be made. This form is filed and a record kept of who uses the cars, object of the journey, its length, also the driver's name and the amount of oil and gasoline. The reverse of this requisition, which is herewith reproduced, shows the form of record.

Before the new department was created, the cars were not cared for by trained men. The drivers obtained their position more or less through politics and were not noted for being mechanics. Nevertheless, the cars have proved to be very satisfactory. Mr. Campbell, who is now in charge, says that the trucks even in their earlier stages were far superior to horses for the city work. Mr. Campbell drove the first car purchased by the city in 1909, and has gradually worked up to the head. Under him competent mechanics and repairmen are now used.

The city owns its asphalt plant for street pavement repairs and large trucks are busy hauling this material, making as high as ten trips a day. With the horses it was difficult to make two trips. The total radius covered is 10 miles, or a circle of about 20 miles is served.

Sanitary inspection is now maintained by the motorcycle men, sample of sewage, ditch water, etc., for analysis being collected by them. In quarantining houses thirty men were formerly employed and stationed at different points in the city. With motorcycles three men do the entire work, and it is claimed give better service at a great saving to the city.

Although records are kept of the cost of operation, and things are now being rapidly systemized, these could not be obtained for publication.

Retail Groceries Find Trucks Well Suited to Their Work

F. G. Bishoff & Company, of Braddock, a suburb of Pittsburgh, is an old motor user. Mr. Bishoff is now using a three-quarter-ton Lippard-Stewart, an Ohio of the same capacity, one two-ton and one three-ton G M C. The larger trucks are used for hauling from the city markets to the store, a distance of something over 10 miles. Overland runabouts are supplied the salesmen, making eight cars in all. This pioneer user started some 6 years ago, with a two-cylinder Rapid, and has gained his truck experience at considerable cost, but now feels that he knows how to use them, and is well satisfied with the results which he is getting, so much so in fact that he is now in the market for two 1000-lb. vehicles for city retail work.

He is interested in the manufacture of gasoline by the vacuum system, sucking the gas from the wells of the Bradford field, so his fuel expense is not so considerable an item.

His nineteen horses have now been reduced to eleven, and during exactly this same time the business has doubled. On the long trips, about one in four is a light load, and he appreciates that it does not pay to haul around a heavy vehicle, and for this work is looking for trucks of under 1500 lbs. capacity. He maintains his own garage with a competent mechanic in charge, whom he pays $100 a month. As a result he says he is having less trouble with his vehicles now, some of which are over 4 years old, than he had when they were new. He is a believer in over-size tires, and uses pneumatics except on the heaviest vehicles. He is strenuous on the point of overloading and does not permit it under any circumstances, even if an extra trip has to be made. This of course applies particularly to his market trucks. His man is instructed to call him up from the city market and state exactly what he has on and the weight before starting the 10- to 12-mile haul.

Mr. Bishoff said, "I was simply desperate with horses before I had trucks, on account of the hills, and in winter the horses were down all the time. Trucks are so far ahead of horses there is no comparison, especially in the winter. Only in the heaviest snows are we held up. We cover a radius of from 8 to 9 miles over these hills on our delivery, covering Wilkinsburg, Edgewood, North Homestead, Swissdale, Hawkins, Rankin and Braddock. I have

	GAL. USED	MILES	MISCELLANEOUS SUPPLIES	REPAIRS
Gasoline				
Oil				
Grease				
Tire Diam.				
Tire				
Tube				
Miles				
Hours out of Service				
Hours Labor				

REQUESTS AND REPORT OF DAMAGES

WITNESS

SIGNED

Report Card in Use by the City of Pittsburgh

This is one of the forms now used in the Central Garage, in connection with the records of the vehicles owned by the city of Pittsburgh, these cars now being under the supervision of the newly created Department of Automobiles.

given up keeping cost records, as my drivers are competent and the garage foreman is holding things down to the lowest limit consistent with good work. I know that trucks are saving me money, and have had much to do with the doubling of my business. How well satisfied I am is shown by the fact that I am now looking for two more light trucks."

This is an example of an advanced merchant who believes in the necessary mechanical equipment, having not only motorized his delivery, but having his own ice plant and other mechanical devices which bring his business strictly up to date.

Delivery Service Builds Department-Store Business

The delivery of the department stores also is fast being motorized. One progressive firm is building up business largely due to its efficient delivery service. At the present time four trucks are in use. These are of the panel type, and all fitted with pneumatics. In addition to these, six wagons, one double and five single, are still employed. These trucks cover a territory the extreme points of which are 80 miles apart. The horses are used only on the specials and in the center of the city, the trucks taking all the long hauls and hard routes. The delivery superintendent as an experiment arranged with the drivers when at the extreme end of their routes, if time permitted, to drive the trucks around through the adjacent neighborhood beyond, and results were carefully watched to see if the appearance of these vehicles in these neighborhoods would cause sales to be made. It was found that it did, and these districts were then added to the truck routes, the trucks beginning further out from the store, and the horses taking care of the near end of the route. In this way the business has been gradually extended.

A Day's Work

The work that is being done daily is typified by the following schedule of one of the trucks:

Left store, 7.45.
Packages delivered, 49.
Miles traveled, 30.
Returned, 1.30.
Left afternoon trip, 2 o'clock.
Packages delivered, 83.
Miles covered, 43.
Gasoline consumed, 7 gals.
Oil, 2 qts.
Miles per gal., 10.
Total mileage, 73.
Total packages delivered, 132.

This delivery included practically all of the north side, Bellevue and Avalon, all extremely hilly districts.

The fuel consumption is noteworthy. Considering the hills, 10 miles to the gallon is a most excellent showing. This is largely due to the driver, who is expert. Drivers work on Saturday nights until every package purchased is delivered. This is a rule of the store.

Monday Morning for Repairs

Monday morning each week the drivers do not have to go out, but are given this time to look over the trucks in the repair shop of the garage where with the assistance of the head mechanic all ordinary repairs are made. The drivers thus assist in the work. At 1.30 they sign a slip, stating that the machine is in running order. The truck then checks out, the regular rack and card system being used. Each employee, including these drivers, is given a register card in the evening when leaving. This card is placed in the timekeeper's box in the morning, and the driver is given an O. K. slip by the cashier, also a C. O. D. slip which shows that his collections are all in. This he signs and hands to the C. O. D. clerk, who gives him the ticket containing the list of packages for his load. After signing for this and packing the load, the delivery begins. Even in passing the goods from the route bins in the basement to the street, an elevator permit stating the number of packages to be passed up for his load has to be signed by him.

The garage is but a few blocks from the store. After registering in and leaving the truck, he returns to the store, settles up with the cashier, gets his slip and his O. K. receipt for the morning's money. After lunch he registers out of the garage, signs for his afternoon load, and is usually back before closing time at 6 in the evening.

It must be said at this point that this company is getting more out of its drivers than usual. The men are interested in their work, take pride in their vehicles and do not object to overtime. This is largely due to the fact that the delivery superintendent takes a personal interest in each man, advances them in pay whenever possible, always in such a way that the others know of it, and has created a rivalry between the men for the best performance, lowest upkeep records, etc. Such records are kept of every item of expense, and the cost of one of the Lippard-Stewarts in this service, which it is claimed is actually covering the territory upon which other department stores have at least three vehicles, is herewith given:

October 21st.
Started, 7.45 A. M.
Miles covered, 30.
Packages delivered, 61.
Left store in the afternoon, 2.15.
Miles covered, 42.
Packages delivered, 55.
Total mileage, 114.
Total packages, 116.
Gasoline consumed, 5 gals.
Oil, 1 qt.
Miles per gallon, 14.

Attention is again called to the excellent mileage.

The following is the cost of operation of a Lippard-Stewart in this service, taking into consideration all items, for one month:

Storage and cleaning	$28.00
139 gals. gasoline at 13 cents	18.07
New tire, 35x4½	29.90
(This tire proved defective, and was replaced the same month, at a cost of	7.14
5000-mile guarantee beginning from date of replacement)	
Repairing blowout in tube	.75
Accessories and repairs	3.25
Depreciation	25.00
Street car tickets for boys	.35
Incline toll	.40
Insurance, fire, accident, etc.	.46
Chauffeur	68.00
Helper	20.00
Total	$201.32

It will be noticed that there are street car tickets and incline toll among the items. This is for the expense of the boys who are often sent to the top of some of the steepest hills on foot or by street car, or on the incline railroads, the cars of which are carried up by cable, while the trucks remain below to save the time, and wear and tear of going long distances around in order to get to the top. Delivery in Pittsburgh is hard not only on the trucks but on the boys. This truck during this month covered 1683 miles in 27 days actual running, or an average of 62 1-3 miles per day. The highest number of packages delivered in any one day was 165, and the total number of packages 3687, or a cost per package delivered of about 5.5 cents. It must also be considered that this month included a new tire at $29, in fact at $37.04, owing to the fact that the tire was defective and had to be replaced even though the mileage guarantee was renewed afresh on the new tire.

Night Deliveries

Although the store closes at six, there are night deliveries to the express office, post office, etc., for express and parcel post packages. Each night a different driver reports with his truck for duty, thus distributing the labor so that it is no burden on any one driver.

Animal Rescue League Uses Novel Truck

Not only is the truck proving itself indispensable in the hauling of merchandise but it is just as indispensable in caring for homeless and unlicensed animals.

The Animal Rescue League, of Pittsburgh, uses a Lange truck with a special and unique body, as shown in the accompanying illustration. This truck was put in service October, 1912, with the idea of giving each dog a separate cage instead of throwing them all into a single compartment to fight and tear each other to pieces as has always been done in the past. As will be seen, the truck body is divided into a large number of individual cages, each with a screen door hinged at the top and automatically locking when snapped shut. There are thirty-four of these compartments. Small spring roller curtains are pulled down darkening the compartment, of a noisy or vicious dog, which usually quiets him. These curtains are also useful in excessive heat, when the sun is beating into the truck, the comfort of the animals being one of the reasons for the purchase of this vehicle.

The Animal Rescue League of Pittsburgh is a corporation not for profit. It grew from a cat club organized in 1908. It now holds contract with the City of Pittsburgh for the removal of all unlicensed small animals from the streets, mostly cats and dogs. The present league had its origin in 1909, and now owns a refuge farm at Verona. This is said to be a model plant. The dog kennels contain accommodations for 153 dogs and cat houses 143 cats. The animals are cleaned and cared for, and good homes secured for them whenever possible.

The city is divided into six sections, and the truck covers one section each day, thus the one vehicle covers the entire City of Pittsburgh, and has to go into the most out-of-the-way corners and negotiate all

kinds of almost impossible hills. Every day the truck makes a trip over an extremely hilly route to the farm which is 10 miles out of the city. In one place in the road the truck coasts for a mile and a half with the power shut off. These daily trips were made even last winter during the heavy snows.

Call Service

In addition, the league maintains a call service day and night with motorcycle vans which replace horses. These were put in service on May 1, 1914. The record of the first 4 months shows an increase in efficiency of 300 per cent. over former methods, there being from twenty-five to thirty calls a day by telephone. On these calls alone in the months of May, June, July and August, 604 dogs and 1467 cats were collected.

Trucks Extend Bakery Business

There is a growing recognition on the part of the business man that trucks are capable of building up business in sections which have never before been covered. With this in view, August Bold, a bread baker of Pittsburgh, last year in November put on a Lippard-Stewart 1500-lb. truck, to build up his trade in an outside district beyond the range of his horses. This truck has given excellent service during the year, covering from 36 to 45 miles in a six-hour day. It usually leaves 6.30 to 7 in the morning. Driver and helper are employed, the driver being really a salesman. All drivers, in fact, are paid a set figure, not less than $15 a week and a commission on the volume of sales. The truck delivered continuously through the heavy snows, using chains on the pneumatic tires. Mr. Bold reports the truck has never been laid up a day since its purchase, and that there has been practically no repair expense. The first set of tires has just been renewed, after 5200 miles service.

Zinc-Lined Body for Bakers

Occasionally, bakers have complained that gasoline trucks scented the food. No trouble of this kind has occurred in this case, perhaps due to the fact that the entire inside of the body is zinc-lined, which prevents the fumes from entering and at the same time makes it easy to clean. This truck caters to the trade at the East End, which is high class, and in the owner's opinion it is very much cleaner and more sanitary than delivering with horses.

The driver in this case is interested in his vehicle, and keeps things in good condition, all repairs being done by the garage where the truck is kept. No cost of operation expenses are kept.

Maintaining a Schedule

Occasionally an installation of trucks is found in which regular schedules similar to railroads are maintained. An example of this kind of systematic operation is that of the Royal Laundry Company, of Pittsburgh. The trucks of this company serve as trunk lines to deliver the laundry to the distributing stations, which are approximately 7 miles from the plant. From these distributing stations eight horse wagons deliver the goods. With the trucks supplying the delivery distributing stations, one hour is gained in the time of starting of the wagons, so that a saving of an hour's time is effected by every wagon in the delivery department. The trucks in use are Lange machines of 2 tons capacity.

An Up-To-Date Bread Wagon

This vehicle has developed a territory never before reached, and one which horses could not reach economically. It is a Lippard-Stewart, and has now been in operation by August Bold, for over a year.

The territory over which goods are delivered is long and narrow, the extreme points being 52 miles apart, these extremes being Oakmont and Rochester. Needless to say, the run to Rochester over Sewickley Heights includes some of the worst hills in the vicinity. During the month of December last year they were unable to reach Rochester on account of the condition of the only road. During this time the trucks went only to Ambridge.

The trucks, however, operate on a regular schedule, and the drivers have strict instructions to maintain these schedules as far as practicable with not more than 5 minutes' leeway. A typical schedule of one of the days is herewith reproduced:

Friday Schedule

	Leave Plant	5.00 A. M.
	Leave E. E. Office	6.00 A. M.
No. 21.	Leave Oakmont	7.15 A. M.
	Leave E. E. Office	8.15 A. M.
	Arrive Plant	9.05 A. M.
	Leave Plant	6.30 P. M.
No. 25.	Leave Sewickley	8.30 P. M.
No. 26.	Leave Ambridge	9.00 P. M.
No. 23.	Leave Rochester	10.15 P. M.
No. 26.	Leave Ambridge	11.15 P. M.
	Arrive Plant	1.30 A. M.
	Leave Plant	12.30 P. M.
	Arrive E. E. Office	1.20 P. M.
No. 15.	Ross and P. R. R.	2.15 P. M.
	Leave E. E. Office	2.45 P. M.
	Arrive Plant	3.35 P. M.
	Leave Plant	6.30 P. M.
	Leave E. E. Office	7.30 P. M.
No. 21.	Leave Oakmont	8.45 P. M.
	Leave E. E. Office	9.45 P. M.
	Arrive Plant	10.35 P. M.

The Dog Wagon of the Animal Rescue League of Pittsburgh

This novel body, with its individual cages with spring screen doors and roller curtains, is used on a Lange truck, in rescuing homeless and unlicensed small animals, such as dogs and cats. It accommodates 34 animals, and has picked up in four months 604 dogs and 1,467 cats.

It will be seen that the trucks start out early in the morning the earliest run scheduled being Wednesday, the first truck leaving the plant at 4 a.m. Only two trucks are employed in this service, and are designated as truck C and D. The first of these was put on in March, 1912, and has been continuously in use, the only time out of service being when the truck was laid up for regular yearly overhauling and repairs. What is known as a truck log is kept for each machine. This gives all items of expense and shows that the trucks travel from 350 to 400 miles per week, or in the neighborhood of 3486 miles a month. The first truck has now covered some 41,600 miles. It is in excellent running condition, and apparently good for many thousands of miles more.

The following is an incident which shows that occasionally keeping records has more value than merely determining costs. As soon as the logs were started, it was found that the gasoline bills were running as high as $21 per week, while the gasoline consumed averaged about $15. The gasoline was kept in an underground storage tank close to the laundry buildings. The usual investigations were made to see that the gasoline was not being used without the knowledge of the company, and failing in trying to determine the cause of this discrepancy, the gasoline tank was dug up. It was then found that some waste had lodged in one of the automatic check valves so that when the gasoline was being drawn this check valve did not close, and the gasoline was going over into the ground. This had been going on apparently for a long time as the entire ground around and under the building seemed to be saturated and it was only by good luck that a fire had not started. The tank was put in shape and no further trouble developed.

Log for Both Trucks for December, 1913

The month of December of last year being one of the hardest in several years for delivery we are recording the cost of operation during that month. It will be seen that all items are taken into consideration and that depreciation is figured at 2 per cent. per month on the depreciated value of the truck at the time and not on its original cost. Although the trucks are garaged by the Royal Laundry, a set charge amounting to one-third per cent. per month of the value of the garage and real estate occupied by it, is made. Tires are figured at $.03 per mile, and a set charge of $36 per year is made for grease. From these it is possible to figure the actual cost of running per mile. This for truck C is shown to be $.24 and for D $.21. It is of interest to see that this is very close to the average for the costs per mile of the two trucks averaged together for a period of 5 months shows $.23½ per mile. In the next to the last column is shown the total cost for the two trucks for December, as $532.12. The same amount of hauling by horses would have cost in the neighborhood of $600. The average monthly cost of the two trucks together is $551, or about $50 less than it could be done with horses, but this as pointed out by the superintendent of delivery, Mr. Sylvester Scovel, secretary of the company, is not in this case the most important saving of the trucks. The total saving in time on all the horse wagons due to the trucks is a very important item.

Since the introduction of the trucks the East End business has practically doubled. It will be noted that this record takes into account, oil, gas, wages, supplies, repairs, tires garage rent, insurance interest, taxes, license charges, etc., no item being omitted which can be construed as a part of the cost of operation.

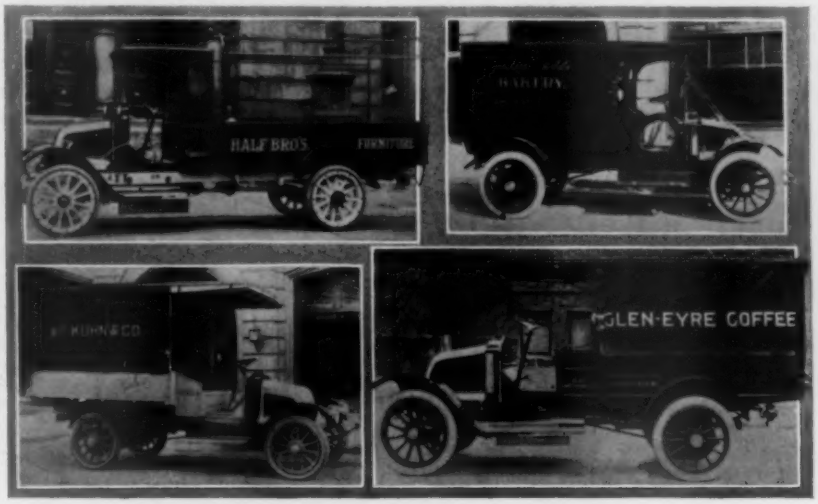
A feature which is of interest is the miles per gallon made by these two trucks in December, 1913, one of the worst years for delivery in the history of trucks, the average mileage per gallon of these two trucks being 6.7, truly a remarkable record.

The management is well pleased with this truck service and attributes in large part the increase of business to the systematic use of these vehicles.

The Introduction of the Four-Legged Van

The Pettit Storage & Van Company, of Pittsburgh, has introduced into its work a most novel time economizer in connection with motor truck handling of furniture and storage warehouse goods. As the name in the title suggests the scheme consists of providing the van bodies which are of course removable, each with four legs which are in reality jacks made by the Barrett Manufacturing Company.

These jacks are permanently attached to the body and provided with plates 10 in. square at the base on which the jacks are mounted on ball joints in such a way that the van body can stand on a sloping surface as readily as on the level. A couple of turns of each of the jacks and the body is clear of the truck chassis which then drives from under it. An arrangement is patented by Mr. R. M. Pettit, president of the company, by means of which bodies can be permanently locked or released from the chassis in 2 minutes. These bodies are of 450 cu. ft. capacity. To load such a body with furniture ordinarily requires from an hour to an hour and a half, and in the neighborhood of an hour to unload, in other words each trip of an ordinary moving van truck ties up



Group of Lippard-Stewart Trucks in Operation in and Around Hilly Pittsburgh

In the upper left is a worm-drive one and a half ton truck, owned by Half Brothers of Homestead, Pa., an unusually hilly section. It is fitted with special furniture body with framework for canvas top. Below it is a side-curtain job, used by W. R. Kuhn Company. This car is fifteen hundred pounds capacity. In the lower right is another grocery truck, used by John Daub's Sons, and above it is a special-panel baker's wagon, with metal-lined sanitary interior arrangements, especially provided for cleanliness.

	Truck	Net Mileage	OIL		GAS		Miles per Gal.		Wages	Supplies	Repairs	Tires	Garage Rent	Insurance	Interest	Depreciation	Depreciated Value	TAXES		Total Cost	Cost per Mile
			Gal.	Cost	Gal.	Cost	Oil	Gas										Truck	Driver		
Dec. 1913	C	1194.9	24.6	$7.39	158.0	$26.86	48.5	7.5	$76.41	$2.95	$84.70	$35.85	$3.33	$17.25	$4.79	$29.35	$1438.22	$0.85	$0.085	$289.81	$0.2426
	D	1132.4	7.7	2.22	186.0	31.62	146.5	6.0	81.00	...	25.29	33.97	3.33	17.25	6.55	39.14	1917.62	.85	.085	241.31	.2132
	Total	2327.3	32.3	9.61	344.0	58.48	71.9	6.7	157.41	2.95	109.99	69.82	6.66	34.50	11.34	68.49	3355.84	1.70	.17	531.12	.2282

Cost and Maintenance Records of Two Lange Trucks, for December, 1913

Used by Royal Laundry Company, of Pittsburgh. For explanation see text

the chassis for 2½ hours, when it could be employed in moving more furniture. With the four-legged bodies, immediately upon arrival at the house the body is mounted on its legs, and the truck drives from under it. In the meantime, a similar body has been loaded at the warehouse, the truck backs under and the body is lowered into place, which is but few minutes' work, then it is locked into position. By a special arrangement of channel iron and angle iron attached to the under side of the body and the upper side of the truck chassis the driver is given about 8 in. leeway. In other words, it is not necessary for him to back absolutely accurately under the body, but same will be guided into place by the above-mentioned angle irons, if within 8 in. of alignment. This arrangement does away with loss of time.

Four-Legged Bodies Save Twenty Per Cent

Each chassis can easily do in ordinary hauling the work of three trucks by means of extra bodies, and Mr. Pettit figures that in general the business can be conducted for 20 per cent. less than before. In addition, the use of these bodies forms a valuable advertising feature and the cards of the company witness this fact by the words in the corner, "originators of the four-legged van."

The company is now using three two-ton Lange trucks in connection with an additional storage warehouse which have just been taken over on Hope Street. This company is an old user of trucks in the storage business, having had a fleet of eight vehicles in connection with another warehouse in the city, so that the introduction of this innovation is based on a practical knowledge of the use of trucks in this line of work.

It is claimed that the jacks have a lifting capacity of 8000 lbs., and will stand a sideswipe of 2000 lbs., so that in loading and unloading the bodies while mounted on the legs there is no danger of tipping the body over in case a heavy piece of furniture is dropped or jostled against the van.

This installation will be watched with interest, and at a very early date we hope to give complete details and blue prints of the four-legged vans which are being perfected by the Lange Motor Truck Company.

THE INDEPENDENT TRUCK CHASSIS $1285

In the advertisement of the Independent Motors Company, Port Huron, Mich., in the October issue of the *Commercial Car Journal*, the price was stated to be $1275, whereas it should have been $1285.

Shipping American Motor Trucks to Europe

One day recently, more truck chasses were seen at Forty-first Street and Bay Ridge than have ever been gathered together at one time on a pier. All day the automobiles continued to arrive at the pier, and were loaded aboard ship for Liverpool. It is said that the trucks of three companies were represented in this shipment via the Russian-American Steamship Company's ship, Suruga.

TRUCKS AND AUTOMOBILES PROMINENT IN NEW YORK'S TERCENTENARY CELEBRATION

On the 28th of October, New York celebrated its 300th birthday with a parade of which all kinds of motor-driven vehicles formed a prominent part. More than two thousand decorated automobiles and trucks were in line to win the $11,000 in prizes offered. One thousand motorcycles also participated. Many of the floats were beautifully gotten up, representing stages in the history of New York, as well as advertising for individual firms. Women suffragists were also prominent with automobiles.

At the close of the parade, Governor Glynn and Mayor Mitchell, honorary presidents of the Tercentenary Committee, were given a reception at the Automobile Club of America.

The official awards in the motor truck division of last Wednesdays' automobile pageant are as follows:

For the best decorated commercial car. First prize, value $500, New York Sporting Goods Company, Indian motorcycle float; second prize, value $200, Edward Callen; third prize, value $100, Max Schling. To merchant entering largest fleet of commercial trucks as owned and operated by him. First prize, value $200, Loose-Wiles Biscuit Company; second prize, $100, New York Edison Company; third prize, value $50, Ward Bread Company.

Emil Grossman Manufacturing Company, Inc., Brooklyn, N. Y., has bought patent No. 1, 112, 793, issued to C. J. Heineman, May 11, 1914, for the Security Windshield cleaner, and also his right and interest in the invention.

American Tobacco Company is using a huge G M C motor truck for demonstrating by means of an ingenious arrangement of moving pictures how easy it is to roll one's own cigarettes, and to advertise Bull Durham tobacco.

A Few of the Many Floats and Decorated Trucks Seen in the New York Tercentenary Celebration

TRUMBULL OFFERS DELIVERY CAR WITH SLIDING-GEAR TRANSMISSION AT $395

The 1915 announcement of the Trumbull Motor Car Company, Bridgeport, Conn., introduces a shaft drive with sliding gear transmission, and the addition of a light delivery body to its line. Some small changes have been made in the motor, giving greater reliability.

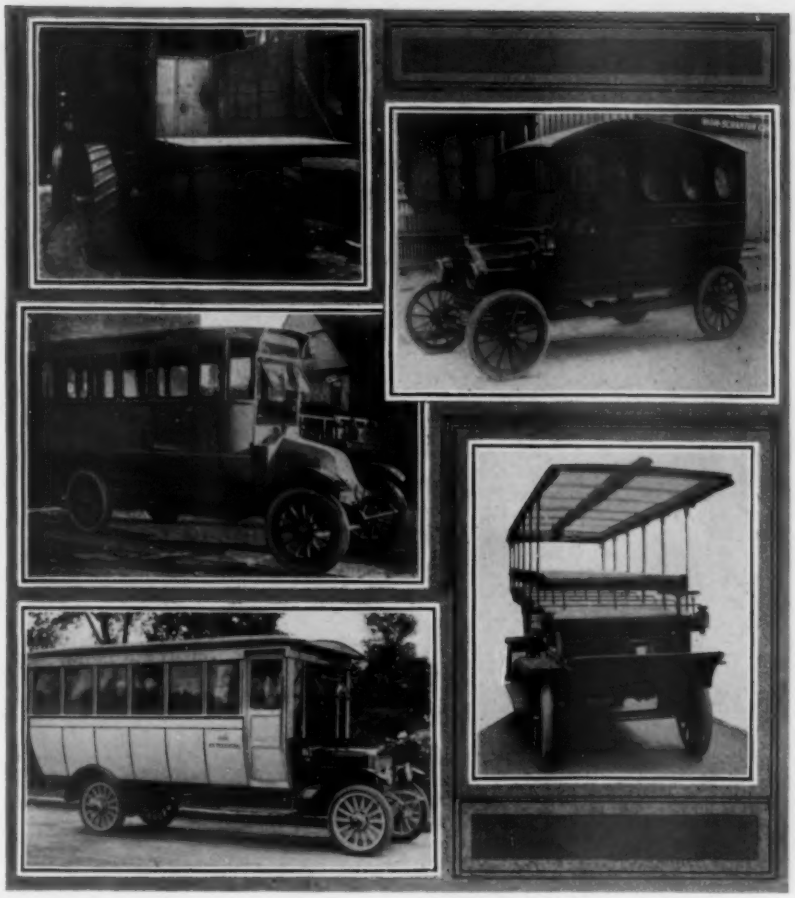
The sensitive transverse front spring is so supported and pivoted as to be highly efficient in absorbing road shocks. A one-ball-joint, V-shaped pair of torsion rods allow the light, free action of the front axle without communication of the shocks to the body, the ball joint allowing the car to rock. The front construction is so designed as to permit of a very short turning radius, which is a very desirable feature. Extra long, flexible cantilever rear springs are used, and by carrying the transmission on the rear axle all the necessary traction for the driving wheels is afforded, as well as giving efficient brakage.

The rear axle is semi-floating, with bevel gear drive, mounted on New Departure barings, and using nickel steel gears. The axle and differential unit are mounted on Hyatt roller bearings.

A cone clutch is used.

The drive is through propeller shaft with enclosing torque tube, with a ball socket at the front. A universal joint is also inside this housing, and connected to the clutch.

The change speed and emergency brake levers are in the center, neatly arranged out of the way. Two sets of brakes are employed, one pair internal the other external.



Trumbull, 1915, Delivery Car. Price, $395

Four-cylinder enbloc 2⅞ x 4 in. water-cooled motor; cone clutch; shaft drive; three-speed selective transmission on semi-floating rear axle; 80 in. wheelbase, 44 in. tread.

A Few Special Body Designs

The upper left illustration shows a wooden body, steel lined, as used in a Mexican mining camp; the truck is fitted with steel tires front and back. Below is shown an omnibus for passenger service at Passaic, N. J. The other 'bus is a two and a half ton Atterbury product, body constructed by the Ideal Shop, Buffalo, N. Y. Upper right illustration shows a bakery delivery body, designed by a woman. Lower right, sightseeing 'bus. Note how top may be rolled up.

KELLY-SPRINGFIELDS HAUL MAIL

Three one and a half ton Kelly-Springfield chasses have just been purchased by Wiles & Foy, who have the contract for hauling United States mail in Seattle.

The requirements of post-office work are exacting because of the fact that a regular schedule must be maintained, rain or shine

New York City garage men have issued the first copy of "Oil Separator News," which chronicles the veto of Mayor Mitchell, affidavits as to the cost of installation of separators, chemists' reports of the conditions of sewers in which explosions occurred, etc. They are still fighting the ordinance and this paper will be issued from time to time until they have gained their point.

Baker Motor Vehicle Company, of Cleveland, O., has sent five demonstrator trucks to England and placed an agency with the Wolseley Motors, Ltd., Birmingham and London.

Austria has bought all the tires held by American firms in Vienna.

Extracts of Papers Read at Recent Motor Truck Club Convention at Detroit

TRAFFIC ENGINEERING

Extracts from a paper read by E. L. SCHUMACHER, of the Denby Motor Truck Company

In presenting this paper on traffic engineering the speaker will not attempt to go into a mass of details covering such items as how to figure horse or motor truck costs, but rather briefly discuss the need for a traffic department and the results it should obtain for the entire motor truck industry from owner to manufacturer.

The motor truck industry in its present state is nothing more than a healthy infant, and if it ever hopes to develop into boyhood and then manhood, it must undergo some improvements in at least two directions.

First and most important of these is along the line of motor truck selling.

Second and next important has to do with motor truck operation and it is in these two lines that the traffic engineer is the "Efficiency Doctor."

Motor Truck Selling

A motor truck is a machine designed and built in a variety of sizes for hauling materials, its chief competitor being the horse-drawn vehicle. This machine called the motor truck has a high first cost and is bought by business men as an investment.

Now here you have the entire sales problem boiled down into one statement. A motor truck is a hauling machine which is to compete with the horse-drawn vehicle and which is to be sold to business men as an investment.

Reaching and Interesting the Customer

Now we know the sales problem, how are we going to solve it? The first step in selling any machine to a business man is to reach him and interest him. How is this to be done? It can be done in two ways, viz.:

First. By properly advertising.

Second. By supplying dealers and their salesmen with reliable, accurate and undisputable data, carefully collected from all the various lines of business which the truck is designed to fit.

By proper advertising is not meant advertising the chemical properties of your springs and axles or the horsepower, bore and stroke of the motor; but it means advertising the service value of the truck and economies to be effected by its installation.

Right here is where the traffic department must start. It must collect the data which should form a basis for all advertising and furnish the dealer and his salesmen with the ammunition, which should not only interest the prospective buyer, but make him ask for an investigation of his own delivery equipment.

Profitable Investment

After we have reached and interested a customer, what is the next step in selling a machine? Why, the next step naturally is to show him that it will be a profitable investment for him to buy. This can only be accomplished after the salesman knows such facts as:

What is the present equipment doing?

What does it cost to operate and maintain it?

Can it be improved in any way?

What can the motor truck operating under these conditions do?

What will it cost to operate and maintain trucks working under these conditions?

Such facts can only be learned after a thorough investigation has been made. A very large percentage of firms think they know what their delivery equipment is doing and what it costs, but actually a very small percentage knows. Therefore a motor truck salesman must be a transportation man, capable of analyzing conditions, comparing costs, accurately figuring savings and correctly advising the proper installations.

Merely going into a prospective customer and telling him he can replace three teams with one truck and save money because one of his competitors did so, is absolutely ridiculous and simply won't get by much longer. Why, I have recently investigated two similar lines of business and found the cost per mile of operating absolutely the same kind of wagons doing the same class of work to vary over 100 per cent.

It is absolutely suicidal to the truck industry to sell trucks predicting savings on this information. The conditions under which deliveries are made, the efficiency of operating the equipment, all vary so widely that it is absolutely impossible to accurately compare costs, figure savings, or advise installation without a thorough investigation.

Knowing the Machine

Now after the average business man has been interested in a machine and convinced that it will be a good investment, there is still one point he must be convinced of. He must be convinced that there is no better machine on the market from the standpoint of price, adaptability and economy.

Here again it is up to the salesman, and he must know his product. This does not mean he must talk transmission, magneto or wheels, but it does mean that the buyer must be convinced that the cost per mile of operating and maintaining the proposed truck will be a minimum and that it will be the proper capacity and design for his particular requirements.

Comparison With Other Machines

This is nothing new in selling machines. I don't believe there is one type of machine excepting the motor truck which is not sold at just described. Take for example the gas producer, steam engine, locomotive, machine tool, before any one of them can be sold the purchaser must be shown:

First. That he needs one.

Second. That it will be a profitable investment

Third. There is no more profitable machine on the market.

Can you imagine a salesman selling steam engines without being so schooled in his product that he could not figure the cost per b.h.p. or the saving to be effected by replacing an older or less efficient equipment?

Can you imagine a gas producer salesman unable to accurately predict the quantity and b.t.u. value of the gas produced together with the savings it should effect over the installations?

Can you imagine a machine tool salesman unable to predict the advantages and exact performances of his milling machines or lathes? And the savings to be effected by this installation?

And likewise in the near future you will be unable to imagine a motor truck salesman unschooled in transportation analysis, costs and economics. Furthermore, there is not one of the above machines which it not sold along the same lines as motor trucks are being sold to-day.

Now you will say, "What is it going to cost to sell trucks, under this plan?" and in answer, I will say, "The selling expense per car will be less, and the number of sales should very quickly double and treble."

You will then most probably ask, "where are we to get salesmen capable of making these investigations, etc.?" and in answer I will say here is where the traffic engineering department comes in again. It does not take any more intelligent or higher grade salesman.

With a little schooling and coaching your present salesmen can all be supplied with the proper data and training and shown how easily he can make these investigations, and it should be one of the most important duties of the traffic department to help in this development.

Fooling the Customer

There is just another point in connection with motor truck selling which I wish to touch upon, and that is "fooling the customer." Motor truck salesmen must realize that it is the truck buyer and not the manufacturer who pays their bills. Just as soon as they realize this they will have the backbone to advise him not to buy if it will be unprofitable, and the foresight to see that a sale made which will not be satisfactory to the customer will most probably spoil the chances for making a dozen or more similar sales, for one dissatisfied owner will do more harm to future business than a dozen satisfied owners can do good.

Motor Truck Operating

With the exception of motor truck selling I believe that motor truck operating offers the greatest field for advancing the motor truck industry quickly. This advancement will be made along three distinct lines.

First. By waging an educational campaign for truck owners and operators. This is being done at the present time by getting the truck owners and operators together once a month. At these meetings there is generally a couple of educational papers presented and the operators exchange their experiences and get light on their troubles.

Second. By injecting efficiency into delivery equipments and methods. Deliveries have been considered necessary evils and have been run in a haphazard way. Very few are run economically. In some cases little things, such as changing routings, or lengthening loading platforms, will save considerable time and money. The salesman when making his investigation should be quick to detect such defects.

Third. By the development of time-saving appliances, such as quick loading and unloading devices, specially designed bodies, etc. It is in this direction and not in motor truck design that the opportunity for effecting large savings is offered. There undoubtedly will be many thousands of dollars saved in this direction.

Conclusion

In conclusion I would simply like to add that any traffic engineering department if it ever expects ot be a success or accomplish results, must bear in mind three things:

First. That every truck owner must be a satisfied owner.

Second. That every dealer must make money.

Third. That to accomplish one and two the traffic department and the dealer must work hand in hand to not only sell more trucks, but also sell them better.

FIELD FOR SMALL-SIZE TRUCKS AVERAGE LOADS OF LIGHT AND HEAVY HAULING

Extracts of paper by E. S. FOLJAMBE, on Field for Medium-Size and Small Trucks

Prior to the introduction of the parcel post the Interstate Commerce Commission compiled figures on merchandise transportation. From these government figures it has been deduced that of the total volume of transportation in the United States, the steamships and railroads combined handle but 15 per cent., leaving the other 85 per cent. to be moved by horse and wagon or motor-driven vehicles. Yet during exactly the period representing the introduction and growth of power-driven vehicles, namely, from 1900 to 1910, the government statistics show an increase of 8.6 per cent. in the number of horses in use on farms and 11.7 per cent. in mules and other draft animals, making a total of 24,000,000 in use on farms alone.

A realization of how little inroad the truck has already made is borne in upon us when we consider the following figures: From 1908 until the present time inclusive, there has been produced in the United States approximately 180,000 commercial cars. One hundred thousand to 125,000 of these are probably now in use. On an average, counting all sized vehicles, these do not displace more than three horses each, or a total number of horses displaced of not over 375,000. When this number is compared to the total number of horses and draft animals in use, 26,000,000, it is found that commercial cars have in reality displaced less than 1.5 per cent., and even taking into consideration the motor-driven farm tractor, the possible field still not covered is fully 98 per cent.

Average Loads of Heavy Hauling but Forty-five Hundred Pounds

For purposes of distinction he classes all motor haulage as either "transfer" or "delivery," and says:

"By transfer is meant the movement of maximum loads from one point directly to a destination without lessening the load, such as the transfer from farm or factories to railroads or steamships, from mine to smelter, from stores to distributing points, etc. This class of haulage has been developed by the large truck to a high state of efficiency, but the average of even this class of load has been shown to be in the neighborhood of but 4500 lbs.

"By delivery is meant distribution of goods to numerous consignees, in which case there is an ever diminishing load upon the vehicle, and almost at no time does it carry its maximum. This is the field for the medium and small-sized truck, and embraces from 75 to 80 per cent. by volume of all merchandise transportation.

"Transfer includes the raw product, while delivery concerns itself usually with the finished product. The total tonnage handled is practically the same, but the volume is vastly greater, the finished product as a rule occupying many times the space of the raw material. This necessitates a large number of delivery vehicles of large volume but small load capacity, as compared to those required to handle the unfinished product."

Many estimates have been made as to the proportion of the total haulage which comes within the field of the medium and small truck. These figures variously estimate that from 75 to 80 per cent. of all merchandise transportation, aside from that cared for by steamships and railroads, can be handled by the smaller vehicle, leaving but 20 to 25 per cent. for the large truck. Yet the production of vehicles has until recently been almost in inverse ratio.

Stability in the industry can never be reached until cars are produced much more nearly in proportion to the demand.

From 60,000 to 80,000 Ford cars are yearly converted into commercial cars; in other words, the demand at the present time for small motor delivery vehicles as expressed by the converted car is so great as to actually equal the combined output of all the truck makers of the country.

Small Car Develops Truck Users

In developing the small unit users, the benefit to the maker of large capacity vehicles must not be overlooked. The sale and introduction of the small truck will undoubtedly have a marked beneficial influence in increasing the sales of the larger vehicles. Thousands of possible users of one or two large capacity trucks can never be sold until they have been developed to a knowledge of motor haulage and delivery by the use of smaller and less expensive delivery units.

Average Load Surprisingly Low

In regard to the weight of average loads in the "delivery" field, there is much ignorance even on the part of the users. Reference to Interstate Commerce figures may be enlightening. These show that 95 per cent. of all parcel delivery packages handled in this country come under 50 lbs. in weight. Investigations by a New York firm making a specialty of analyzing delivery methods show the average of all loads for retail distribution to reach the astonishingly low figure of 550 lbs.

A study of the weight of vehicles and their loads of a large department store of Philadelphia showed that during even the rush period the maximum load on their 3000-lb. truck was but 1195 lbs., and that the average load was not over 900. Similar studies of a very large candy store of New York showed the non-paying load, which, of course, includes the weight of the vehicle, during even the rush period to be as high as 74.7 per cent., leaving the payload but 25.3 per cent. This seems to be fairly true of many lines of delivery. As the payload is a constantly diminishing one, while the non-paying load must be moved over the entire route, it costs too much to deliver the vehicle. Remedy a reduction in the size and weight of vehicle more in conformity with the average loads carried, and more frequent trips with more nearly capacity loads be made.

ADVERTISING RELATIONSHIP BETWEEN FACTORY AND DEALER

Extracts from a paper read by R. P. SPENCER, of the Denby Motor Truck Company

In attempting to speak on this subject I am reminded of the conversation between two men who were not very ardent church goers. One of them said, "Rev. Smith is one of the Lord's greatest fishermen." The other man retorted, "Yes, I think he is. He can dive down farther into the sea of language, stay down longer, and come up drier than any man I ever listened to." To my mind the relationship between factory and dealer in regard to advertising should not be any further removed than a first cousin relationship because the interests of both are identical. In most lines of business the attitude of the manufacturer some years ago was to force a demand for his product on the dealer through advertising to the consumer, but this method has gradually changed because there has come to the manufacturer the realization that the true spirit of merchandizing is to help the dealer—not to force him.

The manufacturer has at his command resources for the securing of definite information in regard to the selling of motor trucks in all parts of the country. Resources which the individual dealer does not have at his command when amplified by the data that the manufacturer can furnish will tend to make a comprehensive campaign for the locality in which the dealer is located.

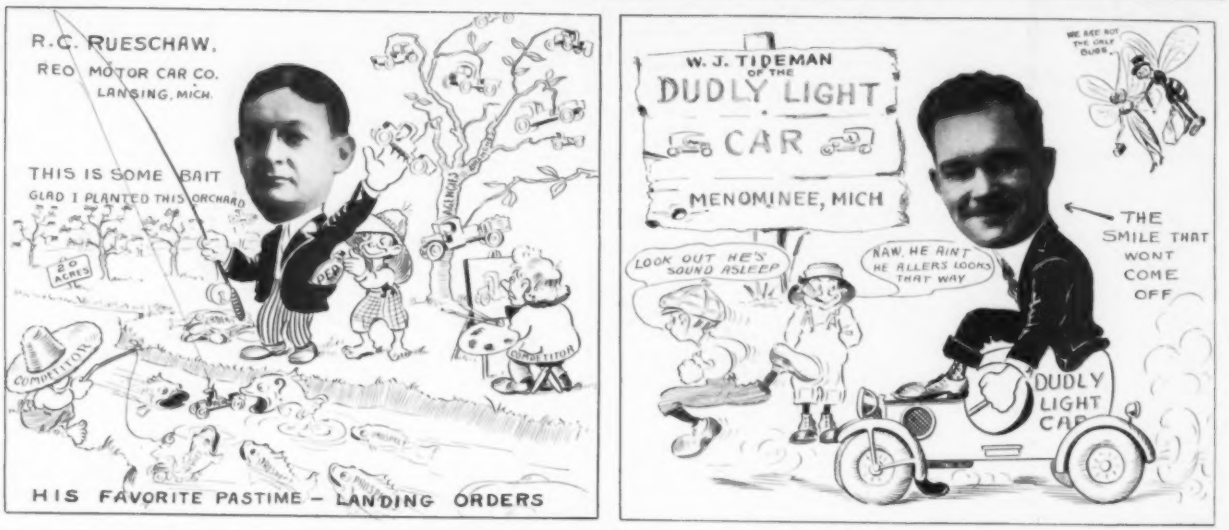
It seems to me that all of us manufacturers can be more alert to the study of the peculiar conditions which confront our dealers in the different localities. Advertising and salesmanship is so co-related that it is impossible to divorce them and no advertising campaign for the dealer should be attempted until a thorough and exhaustive investigation has been made of the dealers' possible market and the particular style and kind of advertising best suited to solving of the problem. An advertising campaign that will produce results for a dealer in Pittsburgh will not necessarily produce results for a dealer in Boston. It is not a question of how much the dealer is willing to spend for advertising but how can the manufacturer assist him to spend it wisely. Each dealer has peculiar ideas of his own as to the sort of advertising best adopted for bringing results and is not going to at all times thoroughly in accord with any cut and dried plan which the manufacturer may have prepared for co-operation with the dealer.

Dealers have said to me, "Advertising does not pay. I placed a few advertisements in the daily papers and nobody has come in and bought a truck." There must be a full realization of the fact that advertising does not push, but that it pulls steadily and that the better it is planned and the more persistently it is carried out the stronger and steadier will be the pull. The usual forms of advertising indulged in by dealers consist of letters, printed broadsides, and newspaper advertising, and a great many of them seem to feel that the advertising is simply a necessary evil. They appropriate a certain sum of money and parcel it out to the men who put up the strongest solicitation for the business rather than on the basis of thorough investigation of the possibilities and adaptation of the form of advertising best suited to produce results under the circumstances. Understand me, this is not an unfavorable criticism of the dealer's advertising methods. It is more an unfavorable criticism of myself and brother manufacturers, for it seems to me that we have not been of as much assistance to the dealer as we could be.

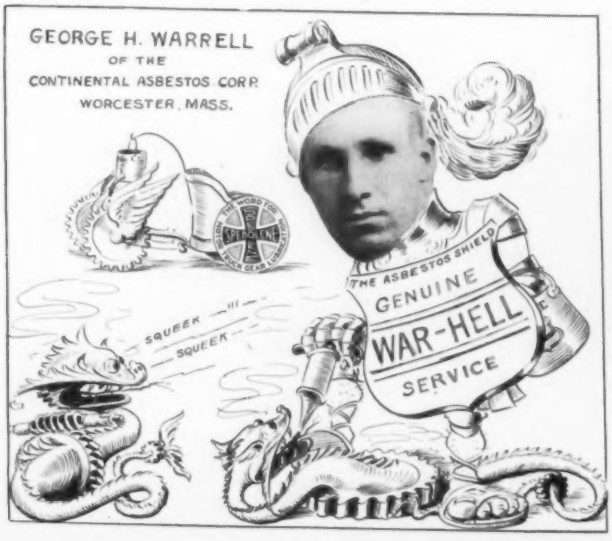
A thorough study of marketing possibilities is necessary before an advertising campaign for a particular city can be planned, and the quantity of any particular type of trucks that can be sold in a given community is not necessarily in proportion to the population. Have talked to various territorial managers of truck manufacturers in regard to the sales possibilities in their territories and find that almost invariably the tendency is to enumerate the different cities in the territory according to population and estimate that a city of large population should sell the largest number of trucks and a city of smaller population a proportionate smaller number of trucks. This is, of course, one angle to figure from, but opposed to that line of reasoning we are confronted with the fact that very often a dealer in a town of 50,000 will sell twice as many trucks as a dealer in a town of 250,000. This would indicate undoubtedly that the dealer in the smaller town is more alive to his possibilities, perhaps, but at the same time there may not be any more actual prospects in the larger city for the purchase of that particular type of truck.

The truck manufacturer should ever bear in mind that he is dealing in big units and that the dealer's advertising must be proportionately broad gauged in conception and execution.

C C J GALLERY of SALES MANAGERS



WM. E. McQUIRK
AMERICAN TAXIMETER CO.
NEW YORK CITY
BUFFALO
NEW YORK OFFICE
THOUGHT BILL WAS IN BUFFALO BUT FROM THE ORDERS COMING IN HE MUST BE IN DETROIT
DETROIT
CLEVELAND
BILL HAS LOTS OF INSTRUMENTS BUT IT TAKES ALL OF THEM TO KEEP TRACK OF HIM



New G M C Gasoline Fifteen Hundred Pound Truck

THIS latest addition of a 1500-lb. gasoline commercial car to the line of the General Motors Truck Company, Pontiac, Mich., gives a very well-rounded line with gasoline models from 1500 lbs. to 5 tons and electrics from 1000 lbs. to 6 tons, giving even greater applicability to the company's motto, "A Truck For Every Purpose." The price is $1090 for the chassis in the lead, including seat, three oil lamps, horn, tools, extra demountable rim and jack.

Motor

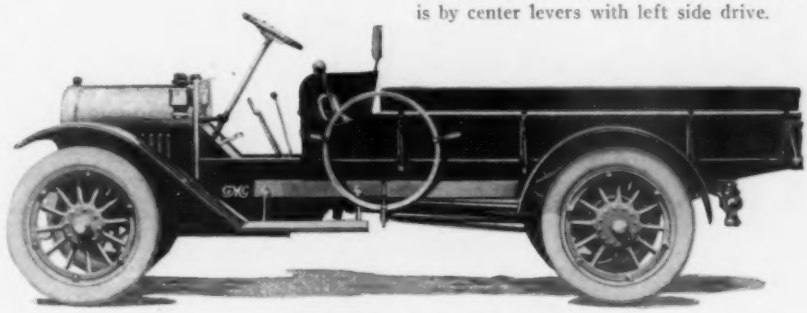
This unit is vertical four-cylinder, four-cyle, water-cooled, carried on three-point suspension, located under hood in front of seat; cylinders 3½ in. bore by 5 in. stroke, cast en bloc, "L" type. Crank shaft is drop-forged nickel steel, heat treated. Cams are forged integral with cam shaft, hardened and ground. Main bearings and connecting rod bearings are bronze backed Babbitt with connecting rods drop forged and heat treated. Valves are 1 11-16 in. in diameter and fully enclosed by removable cover plates. Pistons are special gray iron castings, 3¼ in. long with three rings. Wrist pins are hardened and ground, working in bronze connecting rod bushings, helical timing gears. S. A. E. horsepower rating is 19.6.

Oiling system employs a combination force feed and constant level splash system, with plunger pump driven by eccentric on cam shaft supplying oil to timing gears. Oil drains back to constant level splash pans under connecting rods for splash lubrication of pistons, connecting rods and crank shaft bearings. Indicator on crank case shows depth of oil. The carburetor is an automatic float feed type, double jet, with throttle operated either by hand lever on steering column or foot accelerator. Ignition is jump spark, single system. Cooling system comprises shaft driven, centrifugal water circulating pump, belt-driven fan running on ball bearings and tubular radiator with large water capacity, specially designed for truck service. An automatic governor, fully enclosed and Yale locked, is employed. Speed is 20 m.p.h.

Clutch and Transmission

The clutch is a leather faced cone with spring inserts for easy engagement.

The transmission is sliding gear, selective type, with three speeds forward and one reverse; direct drive on high speed. All gears are heat treated nickel steel, with shafts heat treated high carbon steel, operating on ball bearings. Transmission case is carried on three point sub-frame. Control is by center levers with left side drive.



New G M C Gasoline Truck
Four-cylinder L-head en-bloc 3½ x 5 in. motor, under hood; cone clutch; three-speed transmission; three-quarter floating rear axle; 122 in. wheelbase

Drive

Drive is through propeller shaft of heat-treated high carbon steel with double universal joints from transmission to bevel pinion differential on rear axle, propeller shaft enclosed in seamless steel tube. Driving and torque are taken through universal yoke on propeller shaft tube to frame.

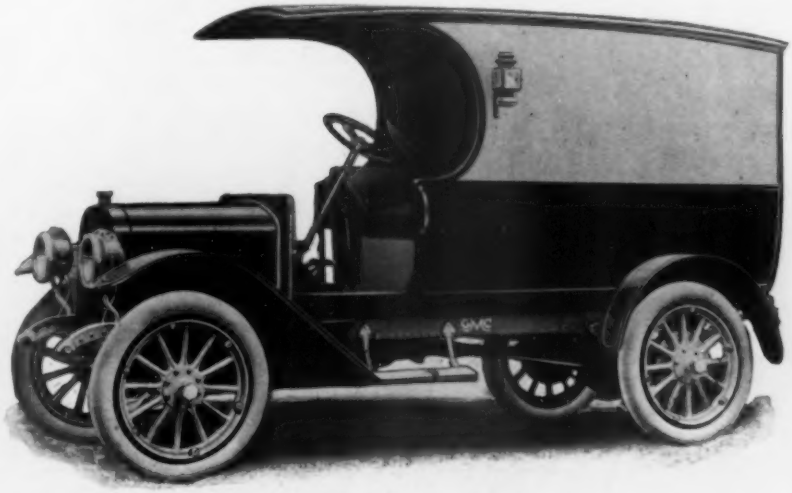
The rear axle is three-quarters floating with fixed drive shafts of heat-treated nickel steel. The front is a drop-forged I-beam, 2⅝x1¾ in. Both brakes operate on rear wheel drums, service being external-contracting and emergency internal-expanding type.

Frame, Springs, Wheels, Etc.

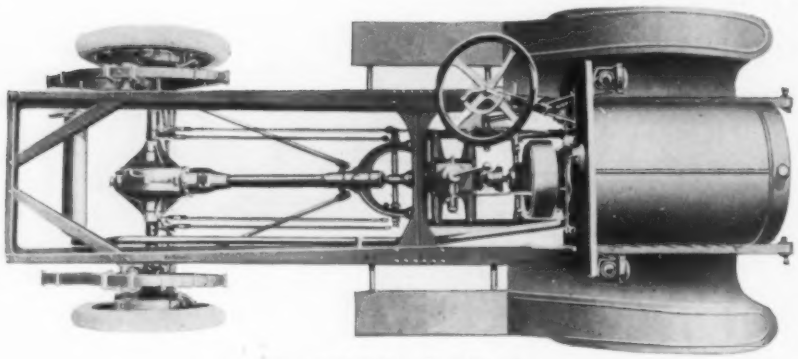
Frame is open hearth pressed steel. Springs are high carbon oil tempered steel; semi-elliptic, 36½x2 in. in front, with seven leaves, and full-elliptic, 40x2 in. in rear, with swivel hangers and eight leaves.

Wheels are artillery type wood with cup and cone bearings in front and Hyatt rollers in the rear. Tires are 35x5in. pneumatics on demountable rims.

The steering gear is irreversible screw and nut type with bronze and hardened steel wearing parts fully enclosed and lubricated. A 17 in. hand wheel is used. The 13 gal.



New G M C Gasoline Truck
This offering is designated as Model 15, and is here illustrated with special panel body



New G M C Gasoline Truck

Capacity 1500 lbs. The chassis sells at $1090 in the lead; with this body, the list is $1215 f.o.b.

gasoline tank is carried under the seat. Wheelbase is 122 in., tread 56 in.

Besides the chassis in the lead at $1090, this truck is also offered with 45x98 in. flare board express body, chassis and body painted, $1215 with tire irons for supporting extra rim. A Prest-O-Lite tank and two headlights list at $25 extra. Load capacity is 1500 lbs. with a body allowance of 750 lbs. Complete chassis scales at 2360 lbs.

centers, and are made of 3½ per cent. nickel steel. Steering is by a Ross gear of screw and nut type, placed at the left. Change speed and emergency brake lever are in the center.

A Torbensen internal gear drive rear axle is used, while the front axle is an I-beam drop forging.

Springs at the front are 2 in. wide by 38 in. long; rear, 2½ in. wide by 45 in. long. The rear springs are arranged to take the torque, following the latest and improved Continental practice.

Brakes are external and internal, on rear wheels. Tires are 36x3 in. solid front and 36x3½ in. solid rear. Pneumatic tires can be had if desired at extra cost. Approximate prices at $45 for 34x4½ in. fronts, and $65 for 35x5 in. rears.

The frame is of pressed steel, channel section, 3-16 in. by 4½ in. deep, 4 in. top flange, extending almost the entire length of the vehicle.

Wheelbase is 120 in.; tread 56 in.; gasoline capacity 15 gals; oil capacity 1 gal.

New Sanford Model O Truck

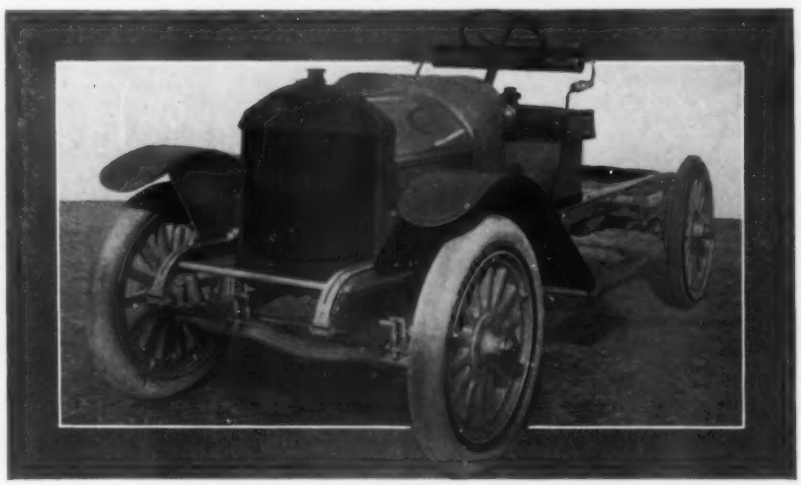
IN DESIGNING this truck no pretense has been made to incorporate parts of special or untried design, but instead recourse has been had to only such parts which have become well known by their quality and which are standard.

No attempt has been made to reduce weight at the expense of safety; all parts, no matter how small their duty is, have been given an ample factor of safety. All strains of pleasure car design have been eliminated and throughout the truck has been built for hard service.

The Model O as illustrated, with express body, lists for $1350; chassis in the lead, $1290.

The motor is a Buda (four-cylinder, 3½ in. bore and 5⅛ in. stroke), water-cooled; three-bearing crank shaft; aluminum crank case. It develops approximately 25 h.p. at 1500 r.p.m. Lubrication is by gear-driven pump and splash; sight feed on dash. Radiator is of Rome-Turney type.

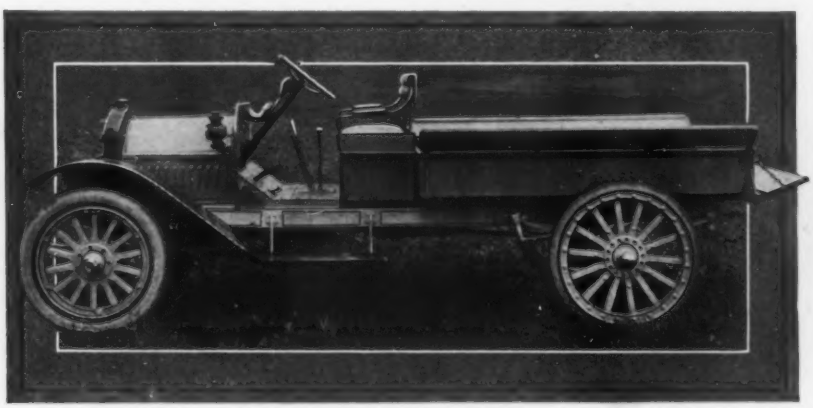
Clutch is multiple dry plate, fitted with a brake to facilitate the shifting of gears. The transmission of selective sliding type, Brown-Lipe make, has three speeds forward and reverse, built as a unit with the clutch and motor forming a complete unit power plant, which is readily removable and accessible. The gears have large faces and wide



Three-Quarter View of the Sanford, Model O Chassis

Note the well-proportioned and sturdy construction.

Normal load speed is 15 m.p.h. This truck is built by the Sanford Motor Truck Company, Syracuse, N. Y.



Side View of the Sanford, Model O

Capacity fifteen hundred pounds; standardized parts used throughout; price, with express body, $1350, f.o.b. Syracuse; electric starting and lighting system, storage batteries, and lamps at $175 additional; chassis in the lead, $1290

STUDEBAKER FOUR DELIVERY CAR CONTINUED WITHOUT CHANGE

With the exception of the tires, which are of increased diameter, the Studebaker Four Delivery Car, built by the Studebaker Corporation, of Detroit, remains practically the same as last year's model. Perhaps the most interesting feature of this car is the fact that it includes the standard electrical system which automatically generates, stores and applies current for starting, lighting and ignition and the sounding of the electric alarm.

During the fiscal season that ended in July, enough Studebaker Four-Delivery Cars were produced to give them a thorough test under all sorts of conditions. They are in use in virtually every city in the country, and their work has been carefully traced by a special staff. The construction of the car has proven so successful that there have been but few changes incorporated in the current model, these being chiefly along the line of increased motor efficiency.

Lewis Five-Ton Truck, Designed Especially for Mountainous Territory

THE five-ton Lewis motor truck was designed especially to meet conditions encountered on the Pacific Coast and in the hilly mountainous country adjacent thereto. There are three requisites for a heavy duty truck in a mountainous country: first, ample power at a minimum cost; second, accessibility on account of long distances between towns in the West; third, light weight and flexibility as far as possible without weakening the construction and design.

To gain these three objects, chief engineer, Mr. Charles B. Lewis, of the Lewis Motor Truck Company, Incorporated, Twelfth and Oak Streets, Oakland, Cal., designed the Lewis truck after several years of very careful study throughout the mining districts is the West. The special features in the designing of the Lewis five-ton truck are that the rear springs are of the full platform type, giving very easy riding qualities. The side members of the platform spring are fastened to the axle on a heavy cast steel spring pad, which is placed as near the brake drum as is possible, and between these side members is hung the frame.

The advantage claimed for this construction is that the frame can be hung between the springs, affording no possibility of side sway, doing away with goose necks and shackles and the resultant wear on same.

By spreading the springs as far apart as is possible the leverage from the point of pressure on the wheel to the axle in relation to the point of spring suspension is shortened up to a minimum and takes all excessive bending strain off of the axle. This permits of a very unique and clean-cut design for the radius rod construction, which is very light and strong.

The radius rod bearing in the rear is placed around the axle and goes forward to another bearing around the jack shaft, so that at all times the distance between jack shaft and axle is equal and there is never an undue strain brought upon the chain.

One of the many difficulties found for heavy duty trucking in the mountains has been the excessive strain brought upon the chain, wheels and tires in starting or stopping. This has been entirely overcome by a short, strong buffer spring midway on the radius rod.

This spring is very heavy and under many pounds compression. The action when starting the truck is to compress the spring; the compression cannot exceed more than ¼ in., as the distance piece is placed under the spring.

The contraction of the radius rod at the spring is very small and allows of a twisting motion to the radius adjusting distance piece. These features have been successfully used and tried out for the past five years under the most severe conditions and without exception have proved the merits of the design.

The Lewis motor truck is also built in a heavy duty three-ton design especially for heavy mountain work and embodies the following features, which have been essential for mountain roads:

Lewis Five-Ton Chassis Fitted With Lowney Dumping Body and McCoy Sand Sprinkler

This truck is used by the Board of Public Works, Street Repair Department, San Francisco. The sand sprinkler is described in detail in the text. The coarse sand sprinkled on the street prevents horses from slipping and automobiles from skidding Mr McCoy, inventor of the device, is shown in the illustration.

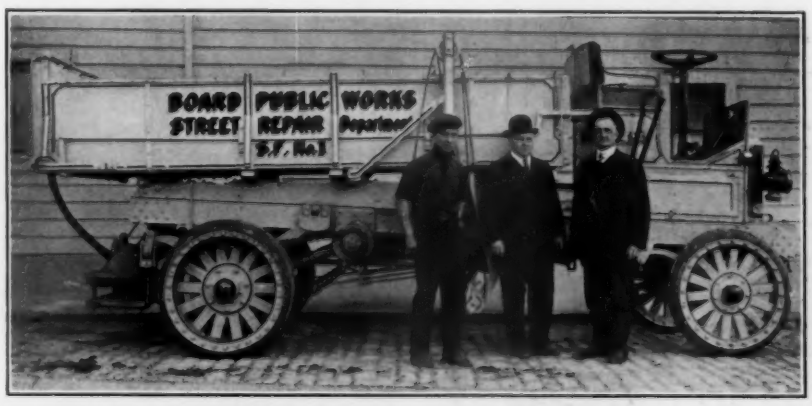
First, the tread does not exceed 60 in. front and rear; this is necessary on account of the narrow mountain roads that a wider track truck cannot travel on. It is also necessary because most of the hauling formerly done was done by horse teams, the wagons have been built with a 60-in. tread so that a truck of 60 in. will track in the same roads as made by the horse teams.

Second, it is absolutely necessary that a truck for mountain work should have a short turning radius on account of the many short sharp hairpin turns that are encountered.

Third, the ordinary mountain roads, have been found by experience, will not sustain travel of a truck greater capacity than three tons, as the heavy five-ton truck will, with constant use on the mountain roads, crush it so that it will have to be kept constantly in repair.

One of the biggest fields for the motor truck is in the West, in the mountainous country, hauling ore from the mines and timber to the railroads. Generally speaking, the road conditions are very poor.

If trucks are built for this use especially and handled carefully there is a great saving over teams, as can be shown by this one example of a five-ton Lewis truck. This



Side View of the Lewis Five-Ton Truck

In the foreground are seen, reading from left to right, Messrs. D. Lowney, Jr., C. B. Lewis and D. Lowney

truck had an average of 6 tons to the load, 18 miles from a copper mine to the railroad, and hauled provisions and supplies back to the mines.

Two round trips were made in 10 hours and an average of 12 tons of ore hauled per day for many months. Formerly it took one team 1 day to haul 4 tons of ore in to the railroad, then 2 days back to the mines; in other words, one team of four horses could only haul 4 tons in 3 days as against one five-ton truck hauling 12 tons in 1 day. Comparison plainly shows the great advantage, not only as to capacity and team, but as to cost.

The latest five-ton truck designed has been furnished to the Board of Public Works, Street Repair Department of the City of San Francisco, who have purchased two Lewis motor trucks equipped with the Lowney power dump body, built by D. D. Lowney & Sons, San Francisco. The construction is very simple and operates directly through the clutch and gear off of the drive shaft.

A very simple unique attachment on this truck is the McCoy sand sprinkler that is used for sprinkling the streets of San Francisco, during wet weather, with coarse sand to prevent horses from slipping and automobiles from skidding.

This sand sprinkler has been invented and patent applied for by Mr. McCoy, Superintendent of Street Repair Department of San Francisco. The operation of this attachment is very simple, consisting of a hopper with gate for holding and controlling sand feed. The sand is delivered through a flexible hose to a revolving disk which has fastened to the top of the disk vanes or blades, which, when revolved, distribute the sand over a large area. This disk is turned by a bevel gear driven by a chain from the main drive shaft and revolves at the same speed as the drive shaft.

Ideal Commercial Cars in Four Models

THE Ideal Auto Company, Fort Wayne, Ind., has a line of commercial cars comprising a Model M, one-ton truck; a Model L, one and a half ton chain drive truck; a Model L, one and a half ton worm drive and a model R, two to two and a half ton truck.

Details Common to All Models

In many respects the four models are similar, so we will give those details first which are common to all.

The motor is a Continental, four-cylinder, vertical, L-head type, 35 h.p., at a speed of 1000 r.p.m. Bore is 4⅛ in. and stroke 5¼ in. The valves are enclosed. Carburetor is a Stromberg and ignition is by a Bosch dual system. Lubrication is effected by a positive plunger pump with force feed and constant level splash having one oil lead to the timing gear and one to the rear main bearing. Cooling is effected by a flat tube radiator and fan operated by a belt and pulley. The water circulation is by centrifugal pump.

The clutch is a multiple disc, dry type member.

The transmission is of Brown-Lipe make, selective sliding type, giving three speeds forward and reverse. Clutch, transmission and motor form a unit power plant.

The steering gear is of Ross make, irreversible type, and surmounted by a large hand wheel. The steering gear is on the right side, with the control levers in the center, to the left of the driver when the motor is mounted under the hood. When the motor is mounted under the seat, the control levers are to the driver's right.

The bearings in the motor are bronze-backed, nickel Babbitt. Roller bearings are used in the transmission and differential and taper roller bearings in the wheels.

The equipment consists of dash and tail oil lamps, Klaxon horn, oil can, tool kit, jack, bumper and set of wrenches. Price of chassis includes driver's seat having a capacity for two persons, on which all the upholstering is of high-grade leather.

Model M, One-Ton Truck

On this model, the drive is by chain to the rear wheels, two Spicer universal joints being used between the transmission and the jack shaft. The sprockets are twenty-two tooth front and forty-eight tooth rear. Chains may be either Whitney or Diamond, 1¼x5/8x5/8 in.

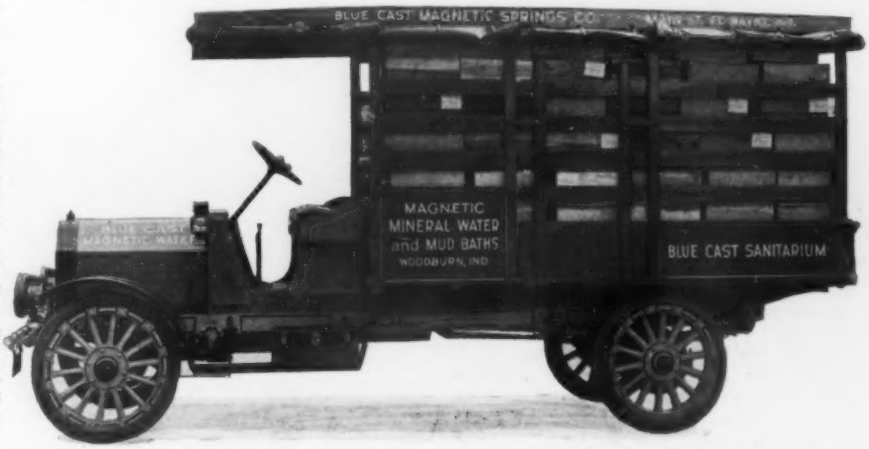
The service brakes are mounted on the jack shaft, the drums being 12x2 in. The emergency brakes are located on the rear wheels, the drums being 12x2½ in.

The frame is of pressed steel, 3-16 in. thick, the depth of side rail being 5 in.

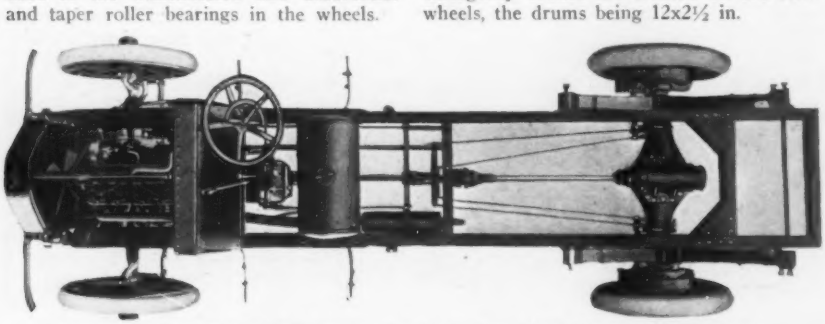
Springs are semi-elliptic front and platform rear. Gasoline tank has a capacity of 20 gal. The wheelbase is 124 in. and the tread 58 in., speed being 20 m.p.h.

The loading space on this model is 8 ft. 10 in. long with motor under the hood.

The price of the chassis is $1750.



Side View of Model L One and a Half Ton Worm-Drive Ideal Truck With Special Body, in Service of Blue Cast Magnetic Springs Company, Woodburn, Ind.



Top Plan View of Model L One and a Half Ton Ideal Worm-Drive Chassis
Showing arrangement of working parts

Model L, One and a Half Ton Chain Drive

This model is much the same as Model M, excepting that brake drums are larger on the emergency; tires are 36x4 in. front and 36x5 in. rear; wheelbase, 144 in.; speed, 14 m.p.h., and loading space, 10 ft. 6 in.

The chassis price is $2000.

Model L, One and a Half Ton Worm Drive

This is the newest model and differs from the chain drive Model L only in that the brakes are both on the rear wheels; gasoline tank holds 18 gal., and wheelbase is 143 in.

The price is the same.

Model R, Two and a Half Ton Worm Drive

This model differs from the others in the fact that it has worm drive, dual tires in rear, 152 in. wheelbase, 62 in. tread, speed of 12 m.p.h., and loading space 12 ft. 6 in. long.

The chassis price is $2500.

All models can be equipped with electric starting and lighting system, including electric lamps, for $250 extra.

Stegeman Trucks in Five Capacities—Fifteen Hundred to Eight Thousand Pounds

THE Stegeman Motor Car Company, Milwaukee, Wis., offers five models of various capacity, viz., 1500, 2000, 4000, 6000 and 8000 lbs. load capacity. The Stegeman is very simply designed and all parts of the chassis are very accessible. The motor, clutch and transmission, each in separate compartments, are in one unit, which construction eliminates complicated connections and at once reduces the entire operating control and the entire moving mechanism to the fewest possible number of parts. Placed under the hood and ahead of the driver's seat, the entire power plant and transmission are rendered immediately and easily accessible, at the same time receiving the fullest protection of the lighter and more flexible front springs.

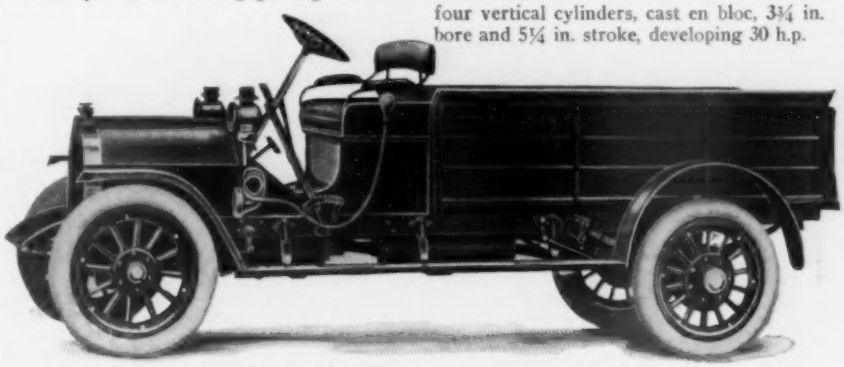
Motors

All motors are of the four-cylinder, four-cycle, true long stroke type, built exclusively for truck duty with heavy three-bearing crank shafts. The long stroke develops a maximum of pulling power at low speeds and avoids excessive fuel and oil consumption. In the 1500-lb. one-ton and two-ton sizes the cylinders are cast en bloc, giving a most rigid construction. In the three- and four-ton motors, due to their large size, the cylinders are cast in pairs, retaining the same economy and simplicity of parts.

The unit construction employed renders unnecessary the use of an under pan and the lower half of the crank case can consequently be quickly removed. This allows easy access to the crank shaft and connecting rod bearings for adjustment. Taking off the oil pan in no way disturbs the crankshaft bearings, as they are all carried in the upper half of the crank case. It also permits removal of the pistons and connecting rods without taking off the cylinders.

All valve mechanism operates in clean, pure oil and is fully protected by dust proof covers. The cylinders are made of reverberatory air furnace iron, aged after boring, then ground and polished to a mirror finish. Crank shafts and connecting rods are drop forged of special analysis steel, heat treated. Helically cut steel timing gears give noiseless operation. Generously proportioned crank shaft and connecting rod bearings, die cast of highest grade white bronze, insure long life and great rigidity to the crank shaft.

The 1500-lb. and 2000-lb. model motor has four vertical cylinders, cast en bloc, 3¼ in. bore and 5¼ in. stroke, developing 30 h.p.



The Fifteen Hundred Pound Shaft-Drive Stegeman Chassis Fitted With Flare-Board Body
The chassis price is $1600

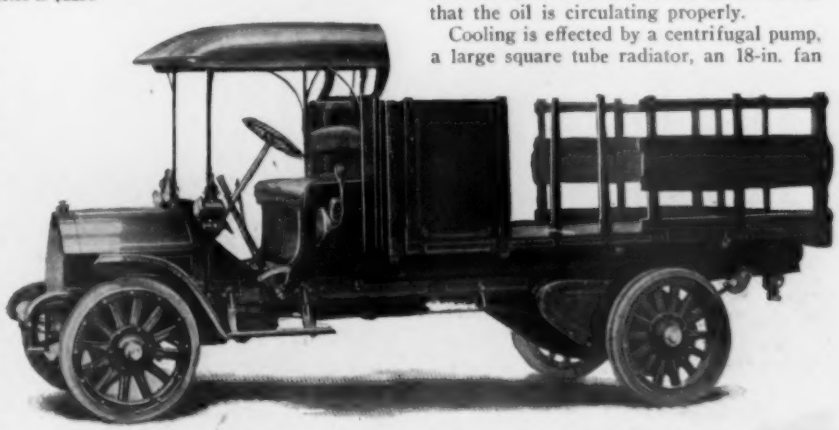
An Enclosed Panel Body on a One-Ton Stegeman Chassis, With Enclosed Chain Drive
The chassis price is $2250

The 4000-lb. motor also has four cylinders, but the bore is 4⅛ in. and the stroke 5¼ in. developing 35 h.p., while the 6000 and 8000-lb. models have a bore of 4½ in. and stroke of 5½ in., developing 45 h.p.

All Stegeman trucks are fitted with a sealed governor, which limits the speed of the motor to 1100 r.p.m. on all models, and the truck to the maximum speed of 20 m.p.h. for the 1500-lb., 18 m.p.h. on the 2000-lb., 15 m.p.h. on the 4000-lb. and 10 m.p.h. on the 6000 and 8000-lb. models.

Lubrication is thorough, and positive lubrication is insured by a constant stream of filtered oil, which is forced under pressure to the main bearings, timing gears, etc., by two patented double-plunger pumps. In addition, a separate splash system provides lubrication for the cylinder walls and pistons. A gage on the motor indicates the amount of oil in the reservoir in the lower half of the crank case, while sight gages mounted on the dash indicate to the driver that the oil is circulating properly.

Cooling is effected by a centrifugal pump, a large square tube radiator, an 18-in. fan



The Stegeman Two-Ton Commercial Car Fitted With Stake Body
One of the features of this truck is the enclosed driving chains, keeping out dust and dirt and allowing the chains to operate in a bath of oil. The chassis price is $2950

and liberal water jackets encircling the cylinders. The sides of the hood are made with perforated sections to aid in giving the most perfect air circulation. The radiator is carried on a steel cross cradle, cushioned from all road shocks. This style of mounting is simple and prevents injury from the twisting of the frame members.

The carburetor is especially built for truck duty, has float feed, and is hot water jacketed. Only one adjustment is provided, that being the gasoline needle valve. A priming valve is provided to facilitate starting in cold weather.

An Eisemann magneto, with automatic spark advance furnishes the ignition. No batteries are used.

Transmission and Clutch

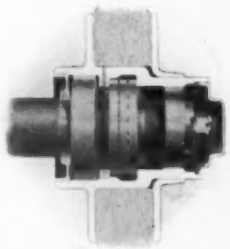
The transmission is of the selective type, with three speeds forward and one reverse, direct drive being on third. This unit is very compact with short rigid shafts, avoiding all danger of straining or springing. The gears are of generous proportions with extra wide faces. The shafts are of large square section and are carried in imported annular ball bearings. A specially selected 3½ per cent. nickel steel, carefully heat treated, is used for both gears and shafts. Being located directly beneath the footboards ahead of the front seat, the transmission unit is readily and immediately accessible. The gear shift lever works directly into the transmission case without the use of rods or complicated connections.

The clutch is of the multiple-disc dry-plate type with hardened steel discs alternated with double faced Raybestos lined steel plates. A plate brake prevents prolonged spinning of the clutch discs and clashing of gears when shifting.

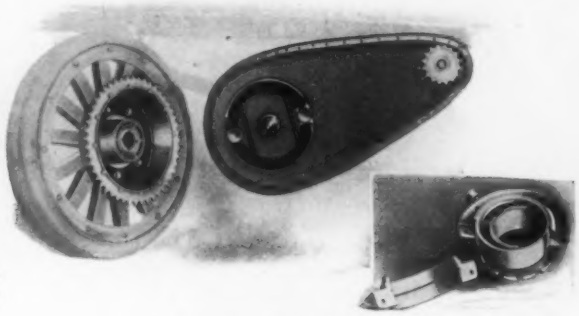
Jack Shaft

A steel housing carries the entire weight of the differential unit and absorbs the bending strains produced at the center by the bevel gear drive. This leaves the drive shafts free to do the driving only and transmit the full power developed by the motor. The gears and shafts are made of nickel steel, heat treated, and are mounted on ball and roller bearings.

To prevent injury to the differential gearing, universal joints and tires by the sudden starting and stopping of the car or by irregular driving, a long torque lever is used. This is anchored to the differential housing and connects to a cross channel on the frame. It cushions or absorbs all shocks.



Ball-Bearing Unit Assembled in the Hub of the Stegeman



Interior of Chain Case
Showing ball-and-socket head with eccentric adjuster

Frame

Nickel steel is used exclusively for the frames, which are pressed into channel sections with a gradual taper at both ends. Nickel steel truss rods are used for reinforcement and extra width is added at the center of the frame, the point of greatest stress.

Springs

Long springs of moderate arc, with a large number of thin leaves, insure great flexibility and easy riding. Proper balance is obtained by using the semi-elliptic type, which prevents the side swaying of load. Excessive spring action under capacity loads is taken care of by an auxiliary cross spring over the rear axle, which permits the use of more flexible side spring for normal loads. They are made entirely of mangano-silicon steel, are hung in lubricated shackles and guaranteed against breakage for life. A wrought iron band is shrunk on at the center of the springs in place of the usual spring bolt. This plan reinforces the spring at its weakest point.

Method of Hanging Springs on the Stegeman

Control

Simplicity is obtained by removing the usual levers from the steering post, there being no spark lever, while a set throttle lever is mounted on the dash. A foot accelerator is provided for driving purposes. Gear changing is effected by one lever, operated by the right hand. One pedal operates both clutch and service brake, making it impossible to use the latter while the power is on, with a consequent saving in wear and tear on the driving mechanism. The emergency brake is operated by a hand lever in the usual way.

Enclosed Driving Chains

The double side chain drive is employed, the chains being entirely enclosed in dust and dirt proof pressed steel housings. The chain thus operates in a bath of oil. The inner plate of the housing is reinforced and acts as a radius rod, relieving the springs of all driving strain. Adjustment of chains is made from the outside through an eccentric, which is located in a ball and socket head in the forward end of the cover. All side strains or those caused by twisting of frame members, is taken up in this large ball and socket construction. The chains are lubricated through a large hand hole in the outer plate.

Brakes

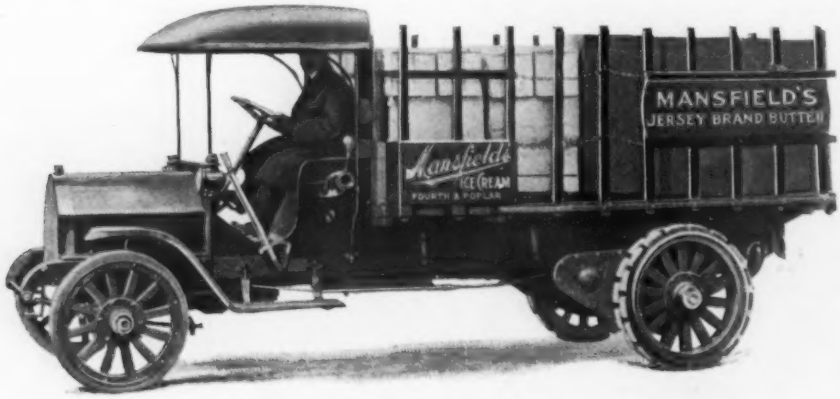
The service brake is of the external contracting type, lined with Raybestos, and located on the forward part of the propeller shaft, back of the transmission, where its effect is increased in proportion to the driving ratio. It is operated by a pedal. The emergency brakes are mounted on the rear wheels and are of the internal expanding type, totally enclosed from road dust and water. They are operated by a hand lever, provided with a ratchet for locking.

Axles

The front axle is drop forged, of I-beam section, with ball bearing pivots in the steering knuckles. The rear axle is of square section, made of chrome vanadium steel, and guaranteed against breakage.

Wheels

The wheels are of the artillery type, of second growth hickory, standard S. A. E. size. In each hub is placed a self-contained ball bearing unit. A special independent steel sleeve carries two imported heavy duty annular ball bearings which carry the load



Side View of the Three-Ton Stegeman Truck Fitted With Stake Body
The chassis price of this model is $3500

only. A separate center ball thrust bearing is so locked onto the sleeve as to take all side thrust. The balls are of liberal size and each held in a separate cage.

Bushings

The Stegeman is fitted with a system of bronze bushings inserted in the wearing portions of all of the more costly or expensive parts of the chassis. The wear is localized in these bushings. They are fitted with compression grease cups, which insure clean lubrication inwardly. While this process adds to the manufacturing cost, it makes the replacement of such costly items, as spring leaves, spring bolts and shackles, brake and lever mountings, steering connections, axle bearings and other parts on account of natural wear, unnecessary.

The foregoing description applies to all models. We shall now take up the specifications of the individual models.

Fifteen Hundred Pound Model

The standard wheelbase is 105 in., long chassis, 125 in. Tires, 34x4½ pneumatic front and rear. The chassis weight is 2500 lbs. and the chassis price is $1600, including two oil side lamps, one oil tail lamp, tools, hubodometer, horn, jack, seat with back and cushion.

Two Thousand Pound Model

Standard wheelbase, 130 in.; long chassis, 150 in. Tires, 34x3 in. cushion in front and 36x4 in. solid in rear. Tread is 56 in. and chassis weight 3400 lbs. The chassis price is $2250, including equipment.

Four Thousand Pound Model

Short wheelbase is 125 in., standard 142 in., and long chassis, 162 in. Tires are solid, front being 34x3½ in. and rear 36x 3½ in. dual. The tread is 67 in., and chassis weight 4250 lbs. The chassis price is $2950, including equipment.

Six Thousand Pound Model

Short chassis has a wheelbase of 135 in., standard 155 in., and long chassis, 175 in. Tires are solid, 36x4 in. front, 34x4 in. dual rear. Tread is 69 in. The chassis weight is 5600 lbs. and chassis price $3500, including equipment.

Eight Thousand Pound Model

Wheelbases are the same as the 6000-lb. model. Tires are solid, 36x5 in. front and 40x5 in. dual rear. The tread is 71 in. Chassis weight is 6000 lbs., and chassis price is $3950, including equipment.

Bodies

No standard bodies are stocked, all bodies being built to customer's specifications.

The Maxim, Model F, Fire Apparatus

This model F piece of apparatus is the regular offering of the Maxim Motor Company, Middleboro, Mass.

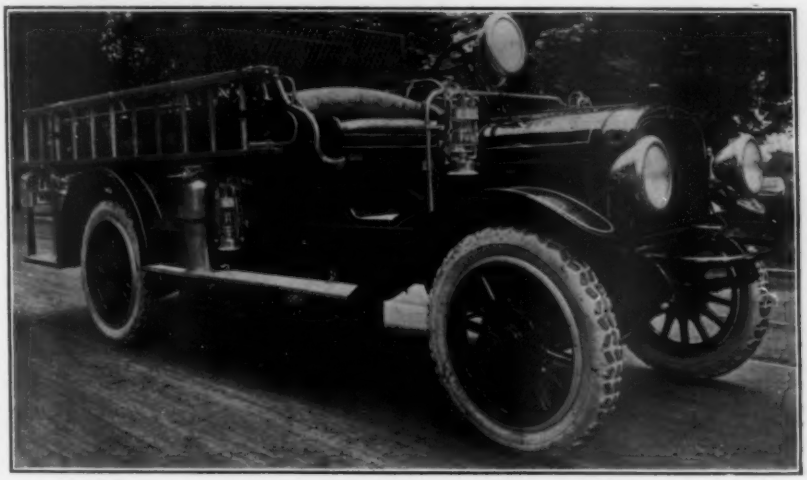
It is fitted with 4½x5-in. four-cylinder motor, with Bosch dual ignition. The radiator is cellular type and the centrifugal circulation pump is cast integral with the crank case.

The oiling system is splash, with two overflow oil basins located in the lower half of the crank case. Into the bottom of these basins are drilled holes of sufficient size to admit a given quantity of oil. The lower ends of the connecting rods passing through this oil keeps a given amount of this in circulation and directs the excess to the reservoir. In addition to this there is cast integral with the upper half of the crank case an oil pocket located directly over each main bearing, which is at all times filled to overflowing and which assures perfectly lubricated crank-shaft bearings.

The transmission is Brown-Lipe of heavy type, with three speeds forward and reverse, and is in unit with jack shaft. Chain drive to rear wheels is used and both brakes are on the rear wheels. There is a straight drive line from clutch to transmission. Clutch is cone type, leather faced, and drive shaft assembly is of the Hartford type. Jack shaft, rear and front axles are made by Sheldon and standard roller bearings are fitted in all wheels. Wheels are heavy with fourteen turned spokes. The front tires are 34x5 and the rear 38x5½, both single pneumatic.

Brakes are lined with Raybestos, both on rear wheels with self-intensifying integral expanding emergency brake and a wrap-up type external which holds the same reversed as when moving forward. Service and emergency brakes are 2½x 14 in. in diameter.

Steering gear is placed on left side, control levers being in the center. An engine starter is not regularly furnished on this model, but any type of body or accessories may be had if desired. The wheelbase is 130 in., with the tread 56. Bodies vary from 6 ft. 6 in. to 10 ft. in length with requirments of type of job. All trimmings, such as rails, lamps, brackets, fixtures of all kinds are nickel plated, and the painting, decorating, etc., is according to specifications.



Regular Model F, Maxim Fire Apparatus
It has a capacity of two thousand feet of two and a half inch hose

This company also builds a model F 4 hose truck, a model F 4 single-combination hose truck and a model F 4 double combination truck on the above chassis.

It also produces a six-cylinder job with a T-head block motor 3½x5½ in., with worm-drive axle of Sheldon design with a David Brown worm. This job is equipped with dual pneumatic rear and single pneumatic front. The motor is equipped with Westinghouse starting, lighting and ignition system. This job has a gear ratio of 6-1 on high. It is known as Model F 6. The company makes a Model T single and double combination equipped with a six-cylinder 5½x5½ T-head motor, mounted on a Priest frame, water cooled, cylinders cast separate, cone clutch, jack shaft and chain drive, 40 in. wheels, dual 3½ in. cushions tires demountable. This job has both Bosch and Atwater Kent ignition, with two sets of plugs.

TRUCK MAKES GOOD ON KNOXVILLE HILLS

To show the possibility of a truck's giving satisfaction in hilly territory, the Commerce Motor Car Company, Detroit, Mich., points to the use of one of its model S-A 1500-lb. trucks by J. F. Walker & Company, a large house furnishing establishment of Knoxville, Tenn. Engaged in this hilly section, this 1500-lb. machine has given great satisfaction, handling pianos, ranges, etc., all average loads, and taking all the hills on high gear. The users consider the truck a "red hot bargain."

New Signal Worm-Drive Truck

THE Signal Motor Truck Company has lately brought out a new model one and a half ton truck with a David Brown rear axle. It was through the urgent request of numerous dealers that the company brought out this new model, which is of the worm type feature called Model H, with a long and short wheelbase, at $1700 and $1750 respectively. It is constructed largely on the principles of the Signal one-ton truck, excepting the heavier axle, tires and other features which are shown by the following description:

Motor

The motor is Continental 3¾x5¼-in. four-cylinder, placed under the hood in front. S. A. E. rating is 22.5 h.p. It is constructed with three-point suspension and is equipped with fan, water pump and governor. Lubrication is by splash, constant oil level being maintained by pump circulation. Ignition is by Eisemann high-tension truck type magneto with fixed spark. Cables are supported in fiber insulator. Stromberg truck type carburetor with hot air intake from exhaust pipe is used.

Cooling is by built-up truck type of radiator, having vertical tubes with fins in the cooling section, this section being made by the Long Manufacturing Company. Top and bottom tanks and side columns are of motor cylinder iron castings, and cooling section is easily removable for repair or replacement. Radiator is mounted on dropped front cross member of frame, and is unaffected by weave of side rails.

Transmission

The transmission is of selective type, standard construction, housed in unit with the motor, and has three forward speeds and one reverse. High gear is direct by means of jaw clutch. Gears and shafts are 3½ per cent. nickel steel, gears heat-treated, shafts case-hardened and ground on all surfaces.

The clutch is multiple-disc, dry-plate type, enclosed in forward compartment of transmission housing. All plates are of tempered saw steel, the driving plates being faced with Raybestos and driven by eight large diameter, hardened and ground steel pins mounted in a spider which is bolted to the flywheel.

Final Drive

Final drive is by double universal propeller shaft to worm-drive rear axle. The propeller shaft proper is of tubular construction, 2½ in. in diameter, while the joints are of cross-pin and yoke construction, housed in grease tight pressed metal swivel housings.

Worm-Drive Axle

Rear axle is the David Brown type of worm, with tapered roller bearings both for wheel mountings and the worm and gear as well. Axle bridge is of electric furnace cast steel, worm housing and brake carriers being also of the same material. The bridge is also fitted with a very heavy truss rod. Live axle shafts are of chrome nickel steel and are 1⅝ in. in diameter. They are heat treated and take the driving torque from the differential by means of six splines each, outer diameter of splines being 2 in. Driving plates are forged integral with shafts and are 8 in. in diameter, being bolted to outer flanges of hubs, making oil-tight joints and eliminating hub caps.

Signal Worm-Drive Chassis

Chassis in priming coat; upholstered driver's seat; front fenders; running board; three oil lamps; horn and tools; lists at $1700 in 120 in. wheelbase and $1750 in 144 in. wheelbase.

Brakes

Both sets of brakes are on the rear axle, and both take effect on the same drums attached to the rear wheels. The service brakes are external contracting, operated by toggle lever, and emergency brakes are internal expanding by means of cams. Both sets are Raybestos faced and adjustable for wear.

Wheels are selected second-growth stock, twelve spokes each, front and rear. Spokes are 1¾-in. square section in front and 2-in. square section in rear. Felloes are fitted with S. A. E. bands for demountable tires. Tires are solid and S. A. E. standard demountable, of standard make, 34-in. x 3½-in. front and 36-in. x 5-in. rear.

Frame and Springs

Frame is special alloy pressed steel, of 7/32-in. thickness of stock and is 4⅝ in. deep throughout its length, except for taper at front end. Side rails vary from 1¾-in. width at motor arms to 3¾ in. wide at center cross member, tapering to 2½ in. wide at rear end, and are inswept forward to shorten turning radius. Both the center and rear cross members are 2½ in. wide and full depth of frame, and are braced by extra long gussets at both top and bottom.

Springs are made by the Detroit Steel Products Company and are equipped with its patented lubricating device. Front springs are 2¼ in. wide x 44 in. long, and rear are 3 in. x 56 in.

Drive Through Springs

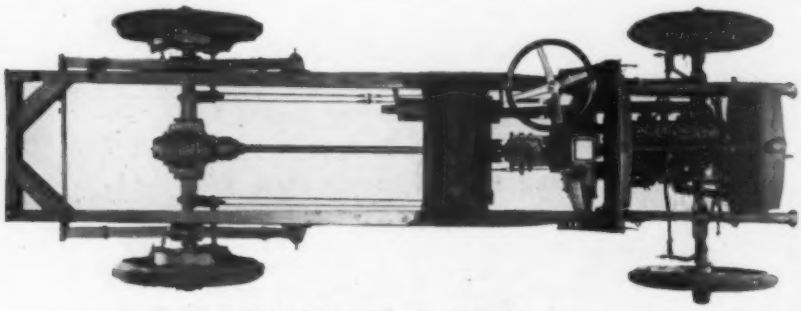
The rear springs transmit the propulsive effort of the rear axle to the frame by means of heavy brackets rigidly attached to the frame, the spring eyes being fitted with 1-in. diameter hardened and ground bolts. No radius rods or torque arm is used, the springs absorbing both drive and torque, the large cross-sectional area of the rear springs at their center, 3 in. x 4 in., preventing undue deflection of the axle, and their ample length, 56 in., absorbing all variation of position between axle and frame and also giving unusually good riding qualities. The braking effect is also absorbed by the springs.

The springs are fastened to the axles by means of large rectangular clips bent over semi-circular clamp plates, thus having no corners to crack through vibratory stress, the tension being taken by double nuts on the clip ends.

Control

Steering gear is Gemmer worm and full wheel truck type, with 18-in. hand wheel, the full wheel permitting of four sets of unworn surfaces being brought into service as occasion arises. Driver's position is on the left side, clutch and service brake pedals being at the left and right of the steering post respectively; gas control is by accelerator pedal in floor.

Wheelbase is 120 in. and 144 in., with 56-in. tread in front and 58-in. tread in rear to permit of full-sized body being mounted low between the wheels. The trucks will turn without backing in a street 34 ft. between curbs for the 120-in. wheelbase and 37 ft. for the 144-in. wheelbase.



Plan of Signal Worm-Drive Truck

Four-cylinder 3¾ x 5¼ Continental motor; dry multiple-disc clutch; three-speed transmission; shaft drive; worm-gear rear axle with drive taken through springs

SPEEDS

The motor is fitted with suction type governor which limits the speed of the car on high gear to 15 m.p.h. maximum. With the governor at this setting, the trucks will make 8 m.p.h. on second speed and 4¾ m.p.h. on low, the gear ratios being 9½ to 1 on high, 17½ to 1 on second, and 30 to 1 on low, giving a very pronounced increase in pulling capacity on low gear.

Standard equipment is driver's seat with spring cushion and upholstered back, front fenders, running boards, side and rear oil lamps, horn and tools.

A very serviceable line of standard bodies has been designed and any of these can be furnished on order.

Loading space in standard bodies is 46 in. wide for both wheelbases, and lengths are 8 ft. behind driver's seat for the 120-in. wheelbase and 10 ft. behind seat for the 144-in. wheelbase. Height of body floor when loaded is 32 in. from ground.

The 120-in. wheelbase chassis lists at $1700, and the 144-in. at $1750. Prices include priming coat, driver's seat and regular equipment.

SPECIAL BODIES APPLIED TO MACK CHASSES

The accompanying illustrations show four Mack trucks, built by the International Motor Company, West End Avenue and Sixty-fourth Street, New York City.

Top view shows a twenty-passenger 'bus mounted on a one-ton Mack chassis. This is of the automobile type of body construction, and gives a very racy appearance to the outfit. Noteworthy are the sloping hood and nickeled windshield. The body has a trunk rack at the rear, and the interior of the body is upholstered in genuine leather. This 'bus is owned by Setzer & Keller, Hazleton, Pa., and is used on a regular passenger line between Hazleton and Freeland, Pa.

Next illustration shows a typical chemical engine mounted upon a one and a half ton chassis, in use at Allentown, Pa. This shows the adaptability of the Mack chassis, and it is interesting to note here that all the equipment shown back of the driver's seat, was formerly part of horse-drawn equipment in the Allentown Fire Department service. This chemical engine complete has a speed of 30 m.p.h. The Allentown Fire Department has four Mack apparatus in service.

The third illustration shows a one and a half ton Mack bottling truck owned by the Coca Cola Bottling Company. This truck has body facilities for carrying two tiers of bottles. The second tier is placed upon a movable floor at the point where the side strip shows the Coca Cola Bottling Company name. The Coca Cola Bottling Company has four similar Mack trucks.

The bottom illustration shows a forty-passenger sightseeing car in use at Elmendorf Farm (Estate of James B. Haggin) near Lexington, Ky. The Elmendorf Farm employs a large number of laborers and office people who reside in the city of Lexington. To facilitate the movement of its employes back and forth from the city to the office and farm, two of these forty-passenger sightseeing cars have been purchased. The Estate of James B. Haggin at Elmendorf, uses five Mack trucks.

Mack Trucks in Various Roles

THE DECATUR PARCEL WAGON

The Parcel Post Equipment Company, 875 North Street, N. W., Grand Rapids, Mich., is marketing the Decatur Parcel Wagon one of the special features of which is the fact that it can be fitted with removable or interchangeable bodies. These bodies can be built for any particular requirements and there can be a multiplicity of them, allowing one body to be loaded or unloaded while the other is in transit.

The Decatur Parcel Wagon Fitted With Roadster Body

This car has a four-cylinder 14 h.p. motor; three speed selective sliding transmission; cone clutch; 102 in. wheelbase. The price is $790

Motor

The motor is a four-cylinder, water-cooled, removable head unit, developing 12-14 h.p. Ignition is by high tension magneto with fixed spark.

Transmission and Clutch

The transmission is of selective sliding variety, giving three forward speeds and one reverse. The clutch is of cone type.

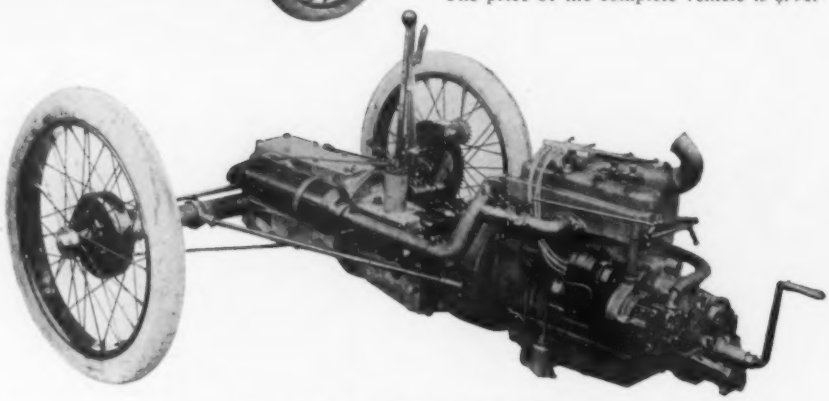
Final drive is through Diamond roller chains. The front axle is provided with ball bearings, the rear axle having Hyatt roller bearings.

Brakes are of the external contracting type with cork inserts. The wheelbase is 102 in., and tread 56 in. Wheels are of heavy wire type and are fitted with Goodyear 30x3½ in. tires.

The load capacity is 800 lbs. and a loading space of 72x32 in. is possible.

The equipment consists of top, windshield, Warner speedometer, two side lamps, one tail lamp, (all electric) tools, horn, pump, electric generator and starter set.

The price of the complete vehicle is $790.



Chassis of the Decatur Parcel Wagon

With front axle removed to show location of motor, transmission and other parts

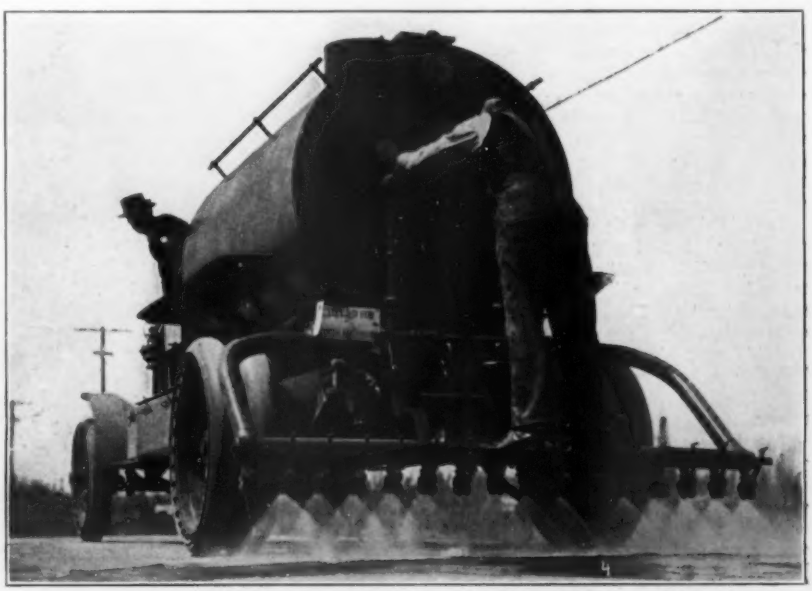
PEERLESS TRUCK FOR PASADENA STREET WORK

The City of Pasadena, Cal., has bought and placed in operation a Peerless four-ton truck equipped with a 950-gal. tank embodying numerous interesting special features for applying oil to macadam roads in process of construction. The tank is normally loaded with hot asphaltic oil running through an overhead pipe into the loading opening at the top. It is fitted with a jacket of magnesia heat insulation material, and the pump for ejecting the oil under pressure through the nozzles is located inside the tank at the forward end. The pump can be connected to an intake pipe and used to fill the tank from a pit below the level of the truck, or to pump out the contents of another tank on a truck or wagon out on the road. It is operated by a chain from a shaft run through a friction clutch from the transmission system. The distribution of the oil is regulated by the pressure within the tank through manipulation of valves at the rear and the speed of the truck.

Features of the truck which make it specially adapted to this work are a 4½ by 6½-in. motor, a long stroke low speed motor designed for truck use; three-point suspension; four-speed transmission giving a very low first speed, and strong transmission construction which is necessary for the truck to do its regular work and run the rotary pump in the heavy oil in addition.

The truck is of the standard Peerless type with trussed frame.

The Pasadena Department of Public Works buys its own oil upon rigid specifications and tests, and sells it to contractors. It also rents out to them the truck for distributing it. The truck may also be rented to neighboring municipalities desiring to take advantage of the standard specifications and standard oil used by the

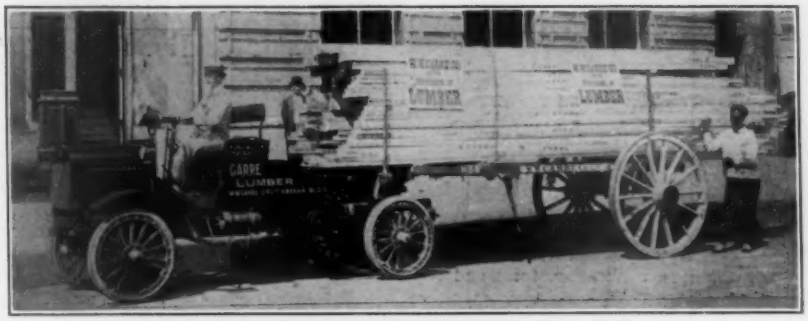


Peerless Truck for Road Oiling—Rear View

Showing spraying mechanism, pressure gage, floating gage, and duplicate nozzles for light and heavy distribution. Chain for driving pump from transmission is placed at forward end of tank

City of Pasadena, under the efficient plan developed by T. D. Allin, Commissioner of Public Works. The city charges $3 per hour for the use of this truck and crew of driver and operator, to cover costs, and not with a view to making a profit. A record will be kept for one year of all costs, including interest and depreciation, and, if at the end of that time readjustments should be made, a new price will be set. A rough check-up of records now available indicates that $3 per hour is very nearly a fair price.

Important advantages over horse hauling are gained in the way of greater penetration of oil among the crushed rock which it serves to unite into a solid highway structure; economy of oil due to evenness of distribution and maintenance of proper pressure, ability to cover greater area in a day and serve more jobs. Where a horse and wagon tank outfit could serve but one contractor per day, the truck will serve three. The tank body is removable and when occasion demands will be replaced by a body suitable for handling gravel.



Wichita One-Ton Truck Employed as a Tractor to Haul the Heaviest Loads of Lumber

Illustration shows a standard one-ton chassis drawing four tons of lumber on the old wagon, over the streets of New Orleans, La. This is one of three Wichita tractors being used with fine results by the W. W. Carre Lumber Company, of New Orleans. The lower plate of fifth wheel is stationary on the tractor and is matched to the upper plate on trailer by means of a removable king pin.

WILLYS-UTILITY PATROL WAGON FOR CEDAR RAPIDS

Cedar Rapids, Iowa, is the latest progressive American municipality to start the elimination of the horse as a means of transportation in its police department. The city recently purchased a special Willys-Utility patrol wagon, similar in design to the large fleet of these vehicles now being operated by the metropolitan police in New York City.

The body, which is a combination patrol and ambulance, is erected on a standard Willys-Utility chassis, specially equipped with electric front, tail and dome lights, and electric starter and generator. The main compartment has a seating capacity for ten people. The inside seats, which are of slatted oak, are so arranged as to permit of their being folded up and fastened in a perpendicular position when additional carrying space is required.

A stretcher for first aid work in street accidents is carried under the right seat and is accessible through a small trap door at the rear without making it necessary for the attendant to enter the body. Removable straps are provided for suspending the stretcher between the seats. An emergency blanket and waterproof cover are carried in a narrow box under the left seat where there is also a compact cabinet for surgical equipment.

Willys-Utility Patrol Operated by Police Department of Cedar Rapids, Iowa

A heavy wire screen separates the driver's seat from the main section of the body, and also extends along the sides from the panels to the roof and at the rear end of the body in panels alongside the entrance.

Adams Employed on a California Stage Line

These machines operate between Madera, Cal., and Sugar Pine, via Triant, a distance of about eighty miles. The road from Triant to Sugar Pine, about sixty miles, is the roughest kind of mountain road, nearly all a very steep grade. The road is so difficult that although a set of chains lasts but three weeks, the owner, an experienced truck man, is very well satisfied with the trucks.

Unusual Features of Design

By C. T. SCHAEFER, Member S. A. E.

IN reviewing the various peculiar constructions in truck designs on the market at the present time, a large variety of unusual features may be found. While many of these are old in principle, they differ to such an extent in application, form and relation to other parts, that they may be worthy of consideration under this title.

Unusual Motor and Transmission Support

An unusual frame construction is found on the new De Kalb one and a half ton model. The motor is mounted rigidly on a sub-frame, which is secured to the main frame by two hinged joints at the front end, and by a single joint at the rear, giving a perfect three-point suspension. The feature of this construction is that the forward end of the transmission is also supported on this sub-frame through a spherical joint of the torque tube. This construction is shown in Fig. 1.

Radius-Rod Designs

The radius rod of the chain-driven vehicle must take the driving thrust of the rear axle as well as the brake pull and the reaction due to the chain pull. These rods must absorb abnormal shocks when the clutch is suddenly thrown in or when backing up to a curb and to overcome this, spring buffers may be used. Fig. 2 illustrates a construction of this type, used on the Velie trucks. The rear end of the rod pivots on the axle spindle, while the forward end carries a large coil spring which takes up these sudden shocks, performing to some extent the functions of a shock absorber. Another feature worthy of consideration is the provision of shims at the rear end to take up wear.

The radius rod also provides a means for taking up the wear in the side chains by adjusting the sprocket centers in or out, as the case may demand. In this connection care must be taken to make this adjustment as accessible as possible to receive the proper attention from the driver of the vehicle. In the Mogul radius rod this is accomplished by placing the adjustment at the forward end of the rod, and outside of the chains. A spherical block is mounted on the jack shaft which carries the adjusting screws, while the rod proper is carried over this so that the adjusting screws passes through it.

In connection with the shaft drive axle, some excellent examples of combination torque and radius rods are presented. These are either of tubular structure or pressed steel members. The construction used on the Flint delivery cars, illustrated

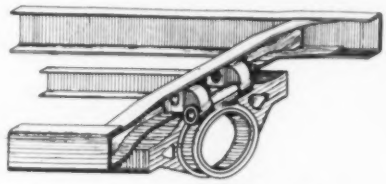


Fig. 1. Unusual Support of De Kalb Truck

The rear support of the motor also serves as forward support of the transmission, through a spherical joint of the torque tube.

in Fig. 4, permits universal movement of the axle. These rods are pressed-steel channels hinged to the rear axle and riveted to a bracket at the front end which carries one end of a cordan cross joint. The other end of the joint pivots in a bracket riveted to a cross member. This bracket also has an extension above the cross member which forms the third point of the sub-frame support.

Special Radius Rod

On the Willet truck a peculiar arrangement is utilized to reduce the stresses on the spring. Instead of the forward end of the spring being rigidly attached to the frame it is connected through the radius rod, which thus relieves the strain from the spring.

A Peculiar Drive Shaft

A peculiar design of drive shaft is used on the G M C electric truck. This shaft consists of a flat strip of steel as shown in Fig. 5. It connects an electric motor with the jack shaft bevel pinion. The motor in this car is mounted upon the rear end of the frame, immediately back of the rear axle and the jack shaft in the usual position, some distance forward of the rear wheels. Both units are direct connected to the frame and the flexible shaft takes care of slight disalignments. However, its chief function is to act as a flexible member in the drive, and relieve the tires of the strain due to sudden application of the power.

Spring Blocks and Clips

The general desire to eliminate spring breakage at the center is seen in the liberal proportions of pressure blocks and spring clips. A variety of constructions represent the attempts of designers to provide a rigid connection between the spring and the seat. A peculiar shaped pressure block (shown in Fig. 6) is that employed on the rear springs of the Selden truck. The block is cut out at the center to allow more clearance between the frame and the axle under extreme deflections. A helical overload spring is arranged to contact with a plate fastened between the upper flange of the frame and a cross member.

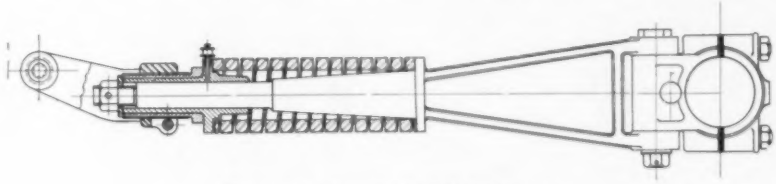


Fig. 2. Radius Rod of Velie Truck

Rear end pivots on axle, while forward end has large coil spring to take up sudden shocks
Shims are provided at the rear to take up wear

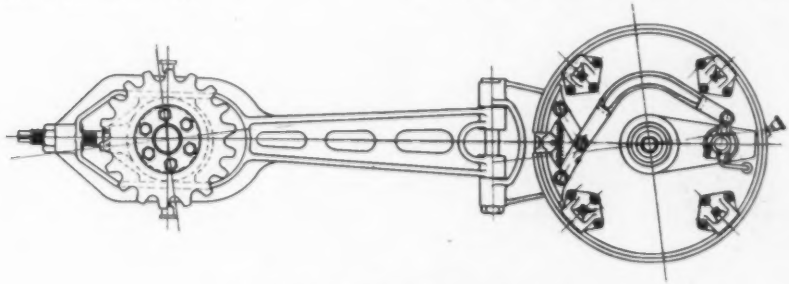


Fig. 3. Radius Rod of Mogul Truck

To make radius-rod adjustments easy, the adjustment is placed at the forward end and outside of the chain

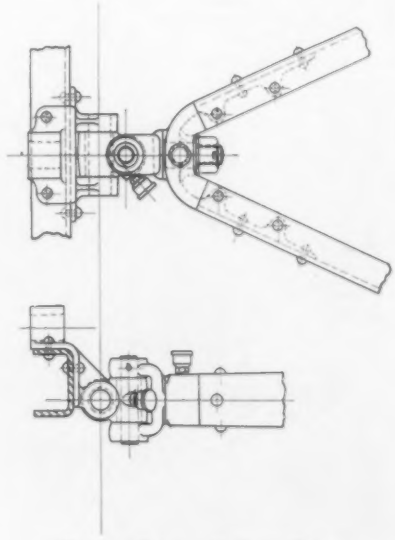


Fig. 4. Torque Rod on Flint Delivery Wagon

It permits a universal movement of the axle

Fig. 7 depicts the method of clamping the front springs to their seats on all Mogul trucks. The spring has a heavy band shrunk on by hydraulic pressure, which does away with the need of a pressure block and very heavy spring clips. To prevent the axle from creeping, a block is placed between the spring and the axle seat. This block has lugs which bear against the sides of the seat, while the clips pass through both and bear against the band on each side.

Lamp Brackets With Springs

The effects of vibration are well known by engineers in general and a subject which is well worthy of consideration by designers is the lamps. In a number of cases light, forged brackets are used, which offer no protection whatever and after several months use are in a very bad condition. To overcome this defect on the U. S. Trucks, the lamp bracket and dash handle have been built together, so that coil springs can be used to absorb this vibration. This is illustrated in Fig 8. The dash handle has a pair of lugs, while the lamp bracket has a single lug, which is inserted between the pair, so that the lamp bracket may pivot on the pin inserted in the lugs. The bracket has an extension on each side to hold the coil springs which absorb the vibrations.

Novel Brake Equalizer

Another feature worthy of mentioning is the brake equalizer used on this truck Its construction is similar to the differential, consisting of two bevel gear sectors and a bevel pinion as shown in Fig. 9. After a short time in service most brake systems become very noisy and, with the construction shown here, a good portion of this can be eliminated. The construction consists of a lever floating on the brake shaft which carries a bevel pinion. This pinion meshes with two bevel gear sectors which are connected through shafts with the brake levers. Two of these brake shafts are used, one for each brake, while the one illustrated carries the rocker shaft for connecting the other with the hand lever. As the brake is applied, both sectors will travel through an equal distance, until the resistance is greater on one side, then the pinion rotates on its stud and equalizes the braking force.

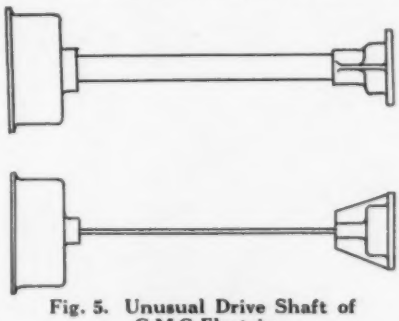
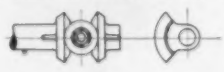


Fig. 5. Unusual Drive Shaft of G M C Electric

A flat strip of steel connecting the jack shaft, which is carried in the usual position, and the motor, carried on the rear of the frame, behind the rear axle. The shaft takes care of slight disalignments and acts as a flexible member to relieve tires of strain due to sudden application of the power.



Strengthening Radiators

Radiators have given considerable trouble, due to leaks which arise during service from severe jolts. This has led to the introduction of cast tanks and sides so that the core is better protected. Among these types the Reo radiator depicted in Fig. 10, offers an excellent example. The vertical pipes are made in small sections and held in place by small clamps. In this way the small sections can be taken off and repaired much easier than in a whole radiator, and if necessary it can be replaced at a small cost. This type of radiator also permits a more rigid mounting.

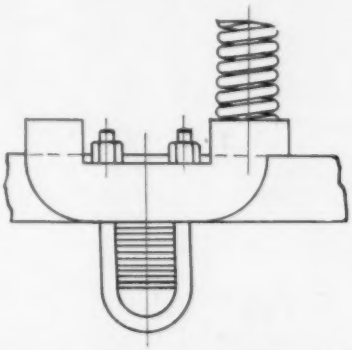


Fig. 6. Clamp of Spring to Rear Axle on Selden Truck

The block is cut out at the center, to allow greater clearance between frame and axle

A Third Brake

Fig. 11 shows the massive internal gear drive rear axle used on the Studebaker three- to four-ton model. A feature worthy of consideration, is the general scheme of the brakes. In front of the bevel gear housing is a very wide brake drum on the bevel pinion shaft. On this brake drum are two brake bands for foot and ratchet hand brakes, but an additional hand emergency brake is provided, not ratchet retained. It consists of shoes acting upon V-shaped ribs running around the outside of the internal gears on the rear wheels close to the spokes. This construction relieves all the brakes from any danger of slipping, due to the leakage of grease around the rear wheels and yet gives a brake acting upon the wheels themselves in case any breakage should put the regular brakes out of commission. The shoes of this emergency brake are only 6 or 8 in. long, one on each wheel, and they are operated by a lever on the right side of the seat, the regular control levers are at the center with right hand steering wheel.

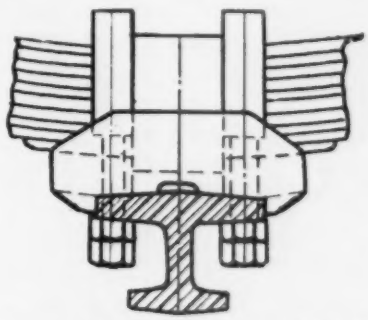


Fig. 7. Method of Clamping Mogul Truck Springs to Their Seats

A heavy, hydraulically applied band takes the place of pressure block and clips. A block with lugs keeps spring from moving on axle.

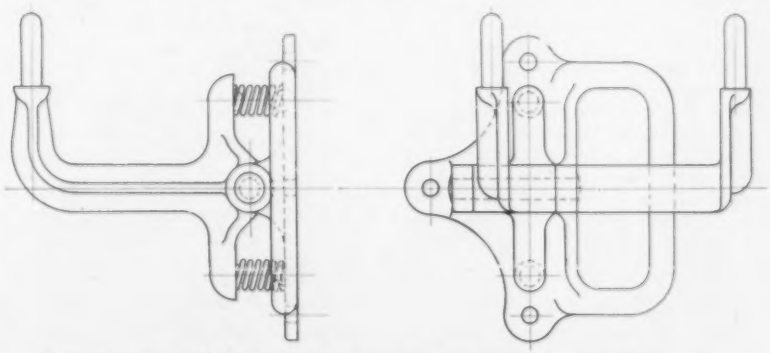


Fig. 8. Combined Dash Handle and Lamp Bracket of U. S. Truck

Coil springs lengthen the life of the other members by absorbing the shocks

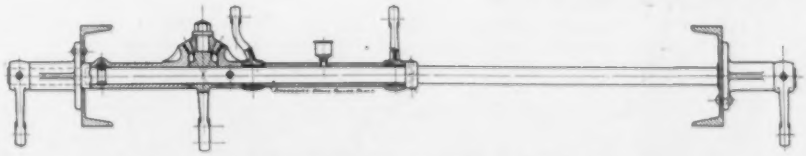


Fig. 9. Peculiar Brake-Rod Equalizer of U. S. Truck

Construction similar to a differential. In applying brakes, both advance equally until resistance is greater on one side, then the pinion rotates on its stud, equalizing the braking force

Simple Brakes

Four-wheel drives have received considerable discussion lately and here attention may be called to the simplicity of the brakes in the Jeffery Quad truck, shown in Fig. 12. They are of the internal expanding type, cam actuated and provided with adjustment at the point of anchorage to the spider. The four wheels, their drive and brakes are identically the same and interchangeable with one another, so that the duplication of parts is a big advantage in the maintenance of the vehicle. The four wheel brakes are controlled by a single foot pedal, while they may also be operated by the hand lever which controls the transmission brake.

Another feature of this vehicle is the spring bumper placed over each spring and shown in Fig. 13. It is supported by a bracket attached to the spring pressure block, while the drive shaft to the wheel passes through its base, thus preventing it from striking the frame.

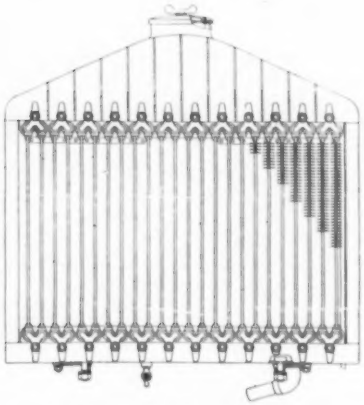


Fig. 10. Radiator of Reo Truck
Cast tanks and sides give core better protection. The vertical tubes are in small sections and held by small clamps, facilitating removal for repairs and reducing cost of same.

Gasoline tanks when soldered and placed under the driver's seat, have, as a general rule, given considerable trouble, due to leaks. It is quite difficult to hold the tank in such way as to prevent the vibration from cracking the solder at the joints. The gasoline supply pipe also has its disadvantages since when the motor is placed under a bonnet, this pipe becomes quite

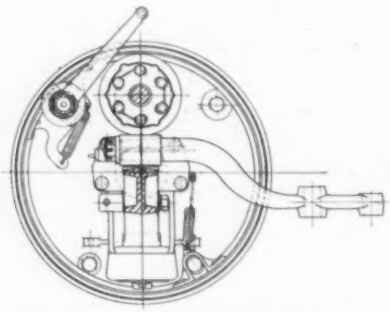


Fig. 12. Brake on the Jeffery Quad
Internal-expanding cam-actuated type of great simplicity

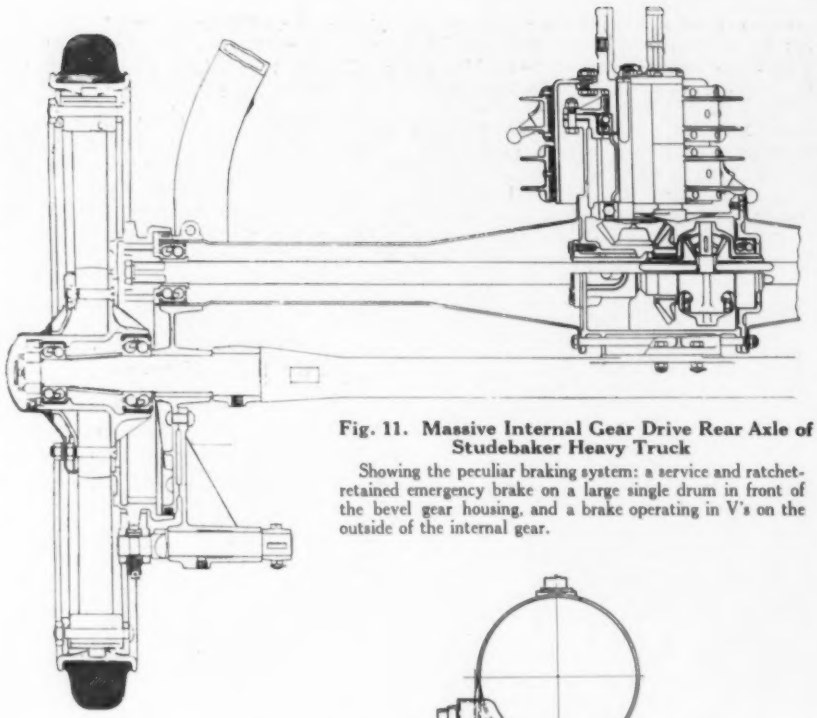


Fig. 11. Massive Internal Gear Drive Rear Axle of Studebaker Heavy Truck
Showing the peculiar braking system: a service and ratchet-retained emergency brake on a large single drum in front of the bevel gear housing, and a brake operating in V's on the outside of the internal gear.

long and it is difficult to keep it free from leaks.

In order to overcome these objections, there has been a tendency to mount a pressed-steel gasoline tank on the dash board, where it can be more conveniently held and vibrations reduced materially in both it and the supply line. When the

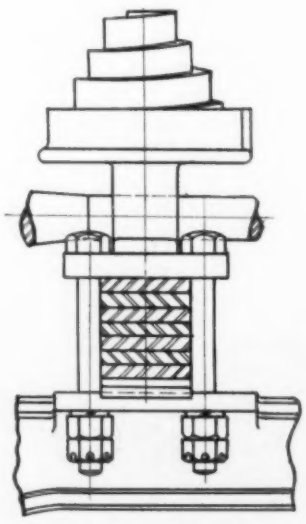


Fig. 13. Spring Bumper on Jeffery Quad
Placed over each spring and supported by bracket attached to spring block

tank is placed under the seat, gravity feed is also somewhat limited and this is entirely eliminated with dash mounting. Among the trucks employing this method may be mentioned the Denby, Signal and Fremont Mais. This is illustrated in Fig. 14.

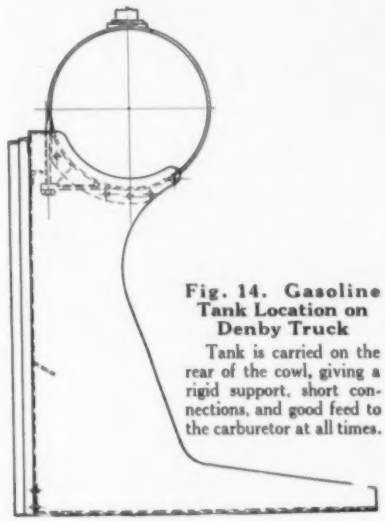


Fig. 14. Gasoline Tank Location on Denby Truck
Tank is carried on the rear of the cowl, giving a rigid support, short connections, and good feed to the carburetor at all times.

GLASS-ROOFED 'BUS

To provide the greatest comfort for passengers has always been the aim of 'bus designers. Many unique constructions have been developed on this account and one of the most interesting is a 'bus used by the John Rackett Taxicab Company, Boston, Mass., the 'bus being operated over some of New England's historic routes.

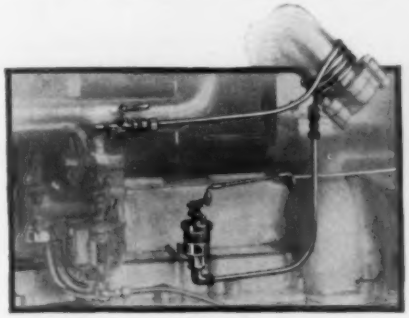
The most interesting feature of the machine is a glass roof, the glass being wired, built-in in sections and flooding the interior with light, although it has no relation to the overhead vision of the occupants.

The 'bus holds twenty-two passengers, all seats being transverse. Between each pair of cross seats is a hinged extension, which ordinarily drops down in the aisle beside the seats, but which, when raised, furnishes an extra aisle seat without a back

Opposite each row of seats is a detachable window, which, when not in use, is stored in a special cabinet suspended underneath the chassis frame.

THE GO MOTOR SPEEDER

As the illustration shows, this is a very simple and easily attached device intended to supply hot air to the carburetor mixture. It consists of a small valve, which



Installation of Go Motor Speeder, $10

is attached by a bracket to the crank case so that it is in line with the throttle rod, to which it is attached to give more air as the throttle is opened. Air enters this device and is conducted by tubing to a coil on the exhaust, where it is heated. From here it is conducted to a nipple in the intake manifold, where it enters the mixture coming from the carburetor, giving greater mileage to the gallon of gasoline and better motor operation. It is listed at $10 by the Go Motor Speeder Company, Three Rivers, Mich.

EASYON TIRE CHAINS

A new device to prevent skidding, etc., is being marketed by the Leather Tire Goods Company, Niagara Falls, N. Y. They are single chains held in place by fastening to the spokes with leather fasteners having snaps which hold the ends of the cross chains. They can be applied quickly and easily even when stuck in the mud. They occupy but little room in the tool kit, are easy on the tires, give long wear and cost but little.

Easyon chains are packed with a set of eight in a bag, making four for each rear

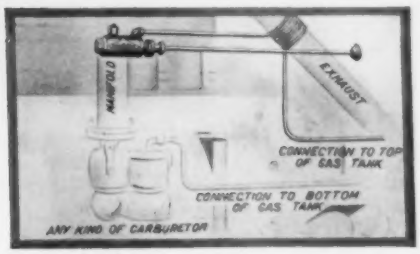
Easyon Tire Chains Applied

Four to each rear wheel. Size to fit 3 to 4 in. tires, 40 cents each; those to fit 4 to 5 in. tires, 50 cents each.

wheel. They are made in two sizes, the small size fits tires 3, 3½ and 4 in., and the large size fits tires 4, 4½ and 5 in. The small size lists at $0.40 each, and $3.20 per set, the large size at $0.50 each, and $4 per set. Cross chains are $0.20 and $0.25 for two sizes; leather fasteners, $0.20 and $0.25.

THE SHURGAS GAS-VAPOR INJECTOR

This is a device which injects the surplus gas generated in the gasoline tank into the manifold or intake pipe of the motor. The injector takes the tank gas, which is pre-heated by the exhaust pipe, to the manifold and supplies a heated and vaporized gas to each cylinder. The effect of this injection on the gas mixture supplied by the carburetor helps to break up the denser gas of this mixture. A saving in fuel and steadier motor operation is claimed for this device. It sells at $12 and is manufactured by the Shurgas Manufacturing Company, Detroit, Mich., which has given exclusive selling rights to the National United Service Company, 306 Ford Building, Detroit, Mich.

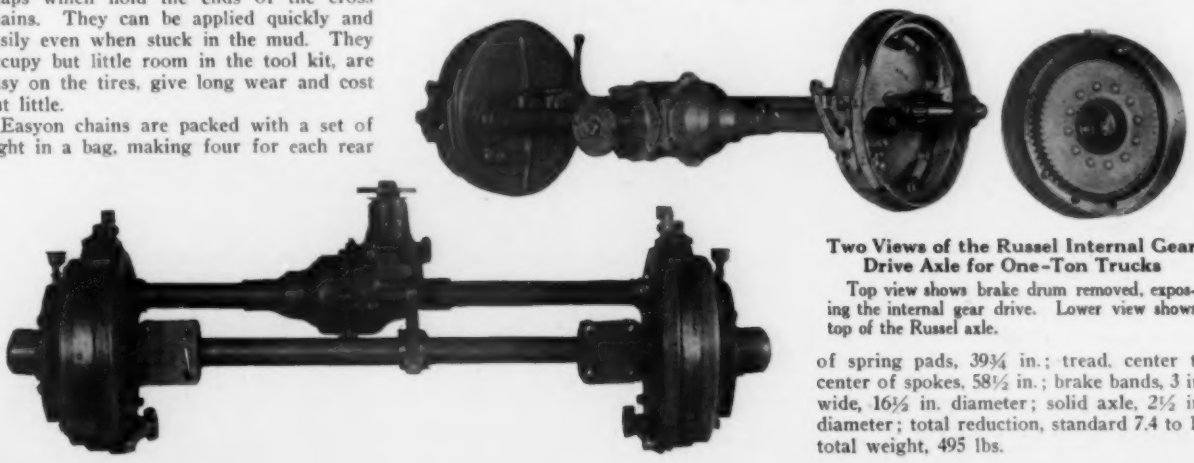


Installation of Shurgas Gas-Vapor Injector

NEW RUSSEL AXLE HAS INTERNAL GEAR DRIVE

This new axle which the Russel Motor Axle Company, of North Detroit, Mich., has designed for one-ton trucks, combines a forged steel fixed axle with a light, high speed jack shaft, driving direct through pinions, and internal gears attached to road wheel hubs.

All driving parts are enclosed and protected from dust and mud. The load is carried entirely on a solid forged steel axle without joints or connections. This construction permits the torque and drive to be taken through the springs, thus avoiding all torque and radius members and cushioning the entire transmission system. A few of the principal dimensions of this axle are as follows: Distance from center to center



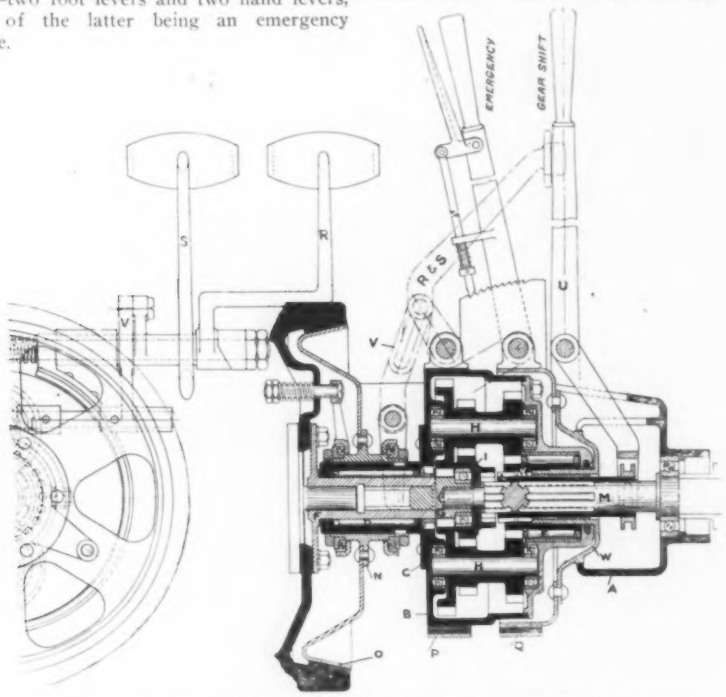
Two Views of the Russel Internal Gear Drive Axle for One-Ton Trucks

Top view shows brake drum removed, exposing the internal gear drive. Lower view shows top of the Russel axle.

of spring pads, 39¾ in.; tread, center to center of spokes, 58½ in.; brake bands, 3 in. wide, 16½ in. diameter; solid axle, 2½ in. diameter; total reduction, standard 7.4 to 1; total weight, 495 lbs.

NEW GEAR SET WITH PERPETUAL MESH

A three-speed forward and one reverse transmission has been brought out by The Motor Mechanism Company, 945 Society for Savings Building, Cleveland, Ohio. This new device, the makers claim, embodies all advantages of the planetary and sliding gear transmissions and eliminates all the disadvantages in either of them. It is operated by the conventional type of control—two foot levers and two hand levers, one of the latter being an emergency brake.



Sectional View of the Motor Mechanism Company's New Perpetual Mesh Transmission

Letters of reference referred to in text

There is no clashing of gears when changing speeds; no idle running gears in direct drive, therefore no drag on oil; only one bearing to cause friction on direct drive, therefore an increase in power and wear; a fool-proof reverse; an absolute neutral position, elminating a start of the car in cold weather when cranking. The low and intermediate speeds are not planetary except for an instant when starting until gear case is brought to rest, then the drive is same as in sliding gear boxes, except that two small, short countershafts transmit the power back to the driven shaft, thus eliminating bending on the latter. In high or direct drive the whole revolves as a unit assuring a perfectly noiseless drive.

General Construction

Frame A supporting the rear end of transmission as well as operating levers and connections, is bolted to engine frame. B is the gear case carrying two countershafts opposite each other. The gear case is bolted to sleeve C wth roller bearing D journaled on sleeve F which is bolted to flywheel and sleeve F supports the front end of the transmission, and transmits the drive on low and intermediate and reverse speeds to the driving pinion G. The rear end of this gear case journals on a roller bearing E on second speed idler K, to which is attached a brake or reverse drum W. I is the low speed or reverse idler, journalled on a ball bearing around drive pinion G. The rear end of this idler has internal teeth to receive the driven clutch sleeve L, sliding on the splined center shaft M, which transmits the drive through a universal joint to the propeller shaft and from there to the rear axle. A splined sleeve N with high speed clutch O slides on sleeve C. Contracting band P is for the low and intermediate speeds forward and Q is the reverse or brake band, as will be seen in the following.

Operation

Gear shift lever is in neutral and clutch pedal R is in its extreme back position. Thus the high speed clutch O is engaged in flywheel and the transmission revolves idle as a unit.

In starting the operation, depress clutch pedal R to neutral, releasing high speed clutch O. Engage gear clutch L through shift lever U, with internal clutch of idler I. Now depress clutch pedal R further forward, leaving high speed clutch O in neutral, thus contracting band P to gear case B, bringing it to rest. This brings the ratio of the drive from zero into low speed. The drive is transmitted through sleeve F to pinion G to countershafts and back to idler I for low, or K for intermediate.

If one should desire to reverse the drive from low, release clutch pedal R into neutral and apply brake pedal S, thus bringing the drive to rest, at which point the reverse takes place. This reverse is purely planetary. To start forward again, merely reverse the pedal action.

After traveling in low speed forward, the gear clutch L may be shifted over to mesh with internal clutch of second speed idler K, to obtain intermediate speed. The clutch pedal should be slightly released when this shift is made.

To obtain direct drive release the clutch pedal to its extreme back position, thus engaging the high speed clutch O with flywheel, locking the whole unit together. It will be clearly seen that direct drive may be obtained directly from low speed also, without shifting the gear clutch L from its engagement with internal clutch of low speed idler I to that of second speed idler K.

While traveling in direct drive, this gear clutch L is shifted at will to either idler without disengaging high speed clutch O. Thus the low or intermediate or reverse speed may be anticipated before they are used; so that later a total forward movement of the clutch pedal (brake pedal for reverse) will obtain the desired speed.

When gear clutch L is in mesh with second speed idler K (usual position), the former reverse action of right pedal S becomes now a brake action, direct on the driven shaft M and not through the gears; therefore this brake is used as the regular service brake. It is readily seen that the position of gear clutch L is almost constantly on the side of idler K, which provides for brake service (not reverse) by right pedal S.

To start the car in second speed it is necessary only to engage clutch L immediately with second speed idler K, thus eliminating the low speed.

Gear clutch L is engaged from neutral absolutely without clashing, by momentarily depressing brake band, bringing idlers to rest for engagement.

The shifting of this clutch L from low into second speed idler or vice versa, is made regardless of the speed of the car on account of the flexibility of the gear case.

NEW TIRE HAS VITALIZED RUBBER TREAD

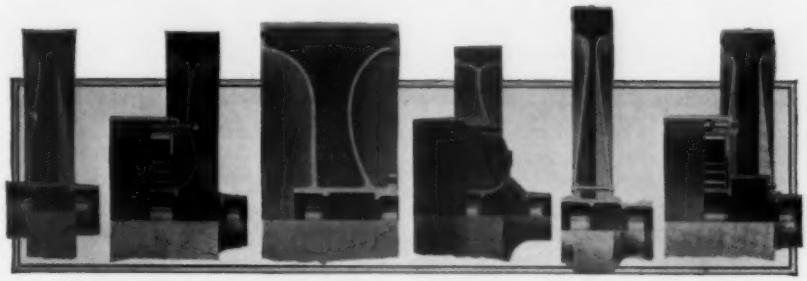
The Vitalite Rubber Company, Woolworth Building, New York City is manufacturing a tire for which exceptional mileage is claimed. The feature of this tire is the composition used in the tread. It is claimed that this tread stock is compounded in such a manner that nearly all the sulphur is eliminated. The compound vulcanizes before the duck and friction are burned, thus producing exceedingly tough tread. Another vital point is the fact that the duck has a great tensile strength and is thoroughly dried before being made into a tire. The tire is also said to be proof against rim-cutting inasmuch as the rim is made up entirely of duck. All sizes are furnished from 28x3 up to 38x5½, listing at $14.40 to $68.05 in plain tread. Never-Skid tread ranges from $17.05 up to $76.20. These tires have a 5000-mile guarantee.

This concern also manufactures a cheaper tire known as the "Armstrong Special" and which has a 3500-mile guarantee. This tire lists at from $13 to $42.75, plain tread, and $14.95 to $49 Never-Skid tread.

BESCO STEEL WHEELS FOR TRUCKS

Believing that steel wheels will be the ultimate equipment for trucks and realizing the many difficulties encountered in developing such a wheel, the Buchanan Electric Steel Company, Buchanan, Mich., is now, after much experimentation, offering a variety of designs of these wheels, as herewith illustrated.

An idea of the general design is shown in the double-disc cast steel front wheel for motor trucks. Its essential features are a cast steel hollow box-section rim supported by a curved spring-like section to struts connecting with the hub. The box section rim is light, rigid, and extremely strong. In reality it is a circular, continuous channel. The shrinkage strains are not severe because the body of metal is not great. The shape of the rim permits the ready attachment of S. A. E. standard tires. The wheel is ready for use immediately after casting and machining. The walls being only 3-16 to 1-4 in. thick, are light and strong, and still are springy where resilience is necessary.



Sectional View of the Principal Designs of Besco Steel Truck Wheels

From left to right they are: double-disc type, cast steel; single disc, cast steel with pressed-steel brake drum and ring gear for internal gear drive; heavy type double disc for dual tires; single disc, cast steel, with integral brake drum; single-disc pressed-steel, with cast-steel hubs; and double-disc pressed-steel for internal gear drive. Those for internal gear drive can also be supplied for chain or worm drive.

A lighter wheel is shown in the hollow rim, single-disc wheel. It will be noted that this design lends itself most readily to the attachment of brake-drums and other parts needed on the rear wheel. The illustration shows the pressed steel brak-drum and a hardened cut-gear for an internal-gear drive.

The application of the double-disc design to heavier wheels is illustrated in the third view, which shows a wheel furnished to the Babcock & Wilcox Company for heavy tractors used for yard switching of railroad cars. This design is light and yet possesses great strength, is rigid and yet resilient, simple in design and attractive in appearance.

The application of this design to a four wheel drive is shown clearly in the fourth illustration. It shows the box section rim, supported by a single disc to the hub. The disc, however, is modified to include a solid cast brake-drum and container for the driving mechanism. The working parts of the drive are thoroughly protected from injury by the wheel disc and brake-drum. It will be noted that in this case the spring construction between the rim and the hub is secured by a wide curvature of the whole disc.

Efforts to descrease the weight of this design finally led to building wheels having the disc and lighter section of the rim made of pressed steel, rigidly connected to cast steel hubs. This is shown in the accompanying cut, which illustrates the latest standard steel front wheel for trucks of one to three tons capacity. The wheel is built up of two pressed steel discs and a cast steel hub. Each disc is shaped at its outer circumference to form one-half of the box section rim. On its inner circumference it is flanged outwardly to form a wide base for pressing onto the steel hub. In assembling, each disc is pressed into place on the hub after the latter has been machined and the discs are held rigidly in place by a series of rivets. Then the two discs are welded solidly together where they join on the outer circumference and also welded to the hubs. After these operations are completed, the pressed steel parts are so thoroughly and substantially connected to each other and to the hub that the whole wheel is practically one piece. No strain of any kind is thrown on to the rivets, and therefore, there can be no working on the rivets in service. It will be noted that this design preserves all of the advantages of the design for the cast steel wheels previously described, with the additional advantage of extreme strength and extreme lightness combined.

The application of this same design to the rear wheel is illustrated in the last illustration. The construction is almost precisely the same as that just described for the front wheel, except that the discs are flanged a little deeper at the outer circumference to form a wider box section rim. Also the cast flange on the inner side of the hub is carried considerably further out toward the rim, and is machined to support the driving mechanism. In the illustration a pressed steel brake-drum and an internal driving gear are shown, both bolted to the outwardly projecting hub flange. An additional advantage to this construction exists in the fact that the driving strain is applied close to the rim of the wheel. Furthermore, the driving is all done through solid steel members. From the outside this rear wheel looks exactly like a front wheel, and is equipped with a geared drive. The wheel can be adapted to any type of drive, excepting, perhaps, the four-wheel drive.

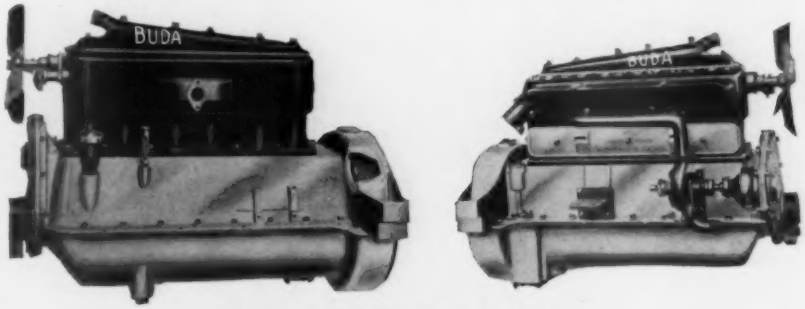
NEW BUDA LIGHT FOUR AND SIX MOTORS

The Buda Company, of Harvey, Ill., has just added to its line two new designs in light motors, a four and a six. Although this company always made a feature of accessibility in its motors, in these two new motors it has really exceeded itself in the production of a neat, accessible design, which, however, has not been arrived at by any sacrifice of constructional features.

The new Buda little four motor, Model RU, is of 3½ in. bore by 5⅛ in. stroke, and the six-cylinder motor Model LSU is of the same bore and stroke. Both these motors are designed for unit power plant type of construction. Where desired, however, plain crank case will be supplied. Both motors are of the three-point suspension type, the rear support being cast integral with the upper half of the crank case, and arranged for main frame support, the forward end being supported at the crank center by a suitable trunion bracket, arranged to rest upon drop cross member of the frame.

The valves, both inlet and exhaust, have an effective working diameter of 1½ in. The valve springs, guides and push rods are enclosed in a dust proof compartment.

Crank cases are made from a special aluminum alloy, and are divided horizontally. The upper half contains the crank shaft bearings, and is provided with special



Left and Right Side of Buda Model RU

A new light, high-speed product of 3½ in. bore and 5⅛ in. stroke. Both these new motors are regularly furnished for three-point suspension and unit power plant construction. Plain crank case will be provided if specified. Provision is made for mounting of any standard electrical system. The six-cylinder model has the same dimensions and features as the four.

lugs for the support of a sod pan, thus eliminating the annoyance of a pan supported from main frame. The lower half serves as an oil pan only, and is provided with a pressed steel trough, into which the connecting rods dip.

The pistons are made of a special mixture of gray iron and are designed for lightness. The piston pins are made of open hearth steel, case hardened, and of large diameter. Connecting rods are "I" beam section, of high carbon open hearth steel, drop forged and heat treated.

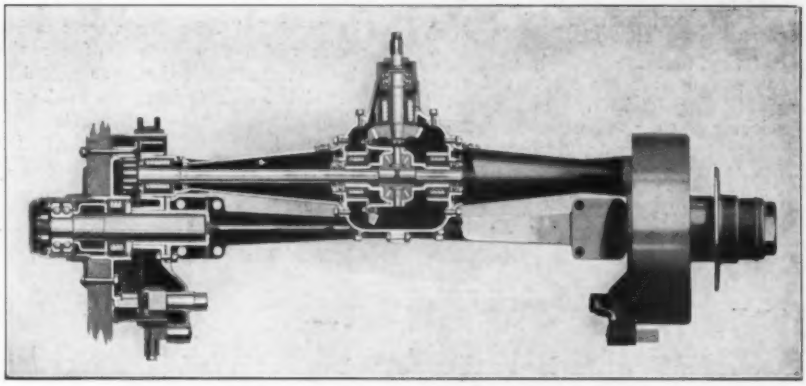
Cam shafts and cams are forged in one piece open hearth steel. The working surface of cams and the bearings are of liberal dimensions and the cams are exceptionally large and very quiet.

The oiling system is of the self-contained, positive feed type, with geared oil pump. The oil is pumped from the oil reservoir, which is located beneath the crank case, and forced through a pipe to main bearing containing pockets to receive the oil. From the main bearings the oil overflows into the pockets of the trough into which the connecting rods dip. The trough pockets have overflow holes on one side, which allow the oil to drain back into the reservoir beneath, so that a constant level of oil is maintained. An indicator, which shows at all times the level of the oil in the reservoir, is placed adjoining combination breather and filling tube.

A NEW INTERNAL-GEAR DRIVE REAR AXLE FOR ONE AND A HALF TO THREE-TON TRUCKS

The Celfor Tool Company, of Buchanan, Mich., has taken up the manufacture of motor truck axles and herewith makes its first announcement. The general appearance of these axles impresses one with their strength and adaptability for the work intended. Use has been made of thin light sections so proportioned as to give the greatest strength with the least weight of metal.

It will be noted that the dead rear axle is an I-beam section, with spring pads integral, into which nickel steel sprindles are inserted, brazed in and afterward carefully heat treated. This I-beam section is enlarged at the center, gradually tapering to the spring pads. This gives the axle great strength and reduces deflection under load. This design tends to hold the live axles in true alignment with the wheel gears and obviates cramping of the teeth.



Cut-away Section of New Celfor Internal-Gear Drive Rear Axle

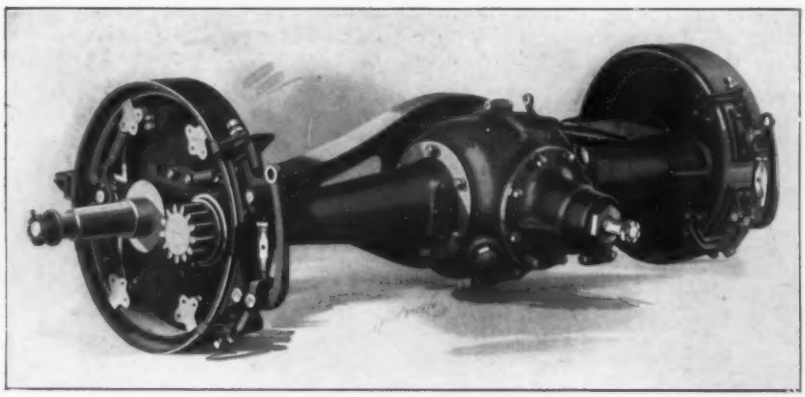
Showing the general constructional features. The wheels are carried on non-adjustable bearings, permitting easy removal or replacement of wheels

Next, it will be noted that the live axle is a unit in itself. It is of tubular construction, ribbed to stiffen the pieces, and is supported by the dead rear axle at its two ends on the brake support castings and at the center is attached to the I-beam section. This makes the dead rear axle and the live axle housing form a strut construction which materially increases the strength of each member. This construction is illustrated herewith.

Attention is called to the size of the gears used throughout the axle, all gears being made from alloy steel drop forgings, hardened, and with special cut four-pitch teeth. The large internal gear, which bolts on to the rear wheels and takes the drive from the driving pinion, is such that two teeth are always in mesh, thus reducing tooth pressure, and this, together with the large size of teeth, allows of graphite instead of grease lubrication, avoiding all possibility of grease being thrown out at the rear wheels. The wheels, it will be noted, are mounted on non-adjustable bearings of very ample size, this permitting a wheel to be taken off or put on without regard to adjustment of bearings or gears.

Both sets of brakes are on the rear wheels, are large in diameter and of very wide face, insuring long life and positive action. The brakes are so designed as to accomplish gradual retardation, rather than positive gripping action. A feature of the brake construction is a pressed steel disc carrying a felt around its periphery in contact with the inside of the pressed steel brake drum to separate the brake chamber from the gear chamber. This serves the purpose of excluding dust from the gear chamber, and at the same time so houses the gears that if any part of the brake mechanism should break or loosen it cannot get into the gear chamber and injure the gears. A steel cover also houses the brakes on the inside of the axle, excluding mud and dust.

The axle is symmetrical, there being no right or left hand pieces in its construction except the differential case. No attention need be paid, therefore, to rights and lefts in specifying repair parts.



New Celfor Internal-Gear Drive Rear Axle

Brakes give gradual retardation rather than positive gripping action. A feature is the use of a pressed-steel disc with a felt on its periphery, this felt being in contact with the inside of the brake drum, excluding dust from the gear chamber and preventing broken brake parts from entering gear chamber in case of an accident.

NEW FEATURE OF DIAMOND TRUCK CHAINS

The Diamond Chain and Manufacturing Company, of Indianapolis, Ind., manufacturer of Diamond Truck chains, has just announced two new features which should be of much interest to truck manufacturers and truck users.

Diamond chains are now furnished in the cotter pin detachable type, for which there is a popular demand among truck users. The new cotter pin type has the standard Diamond features. Rivets and bushings are assembled, under pressure, with sides having reamed holes—a style of construction that insures a permanent driving fit. Nickel steel rivets are used.

The other new feature is an improved and scientific process for heat treatment of wearing parts. No announcement has been made as to the details of this process, but the results accomplished are a much tougher core and a close grained case of uniform depth that greatly increases the wear resisting qualities of the chain.

In these days of increasing prices, it is interesting to note that these new features have been announced without any accompanying increase in prices.

Europe's War One of Motor Cars

By OUR FOREIGN CORRESPONDENT

(Continued from our last issue.)

The armored cars employed seem to vary greatly. Some with armor ⅜ in. thick, perhaps, representing the land counterpart of the battle cruiser, while others, armed with only the thinnest sheet, such as is turned out by Firths, of Sheffield, for aeroplane work, represent the light cruisers. I understand that this material—1/16 in. thick—can resist rifle fire at 400 yards. The Belgians also have a material that they call compound steel, and bodies armored with this metal, 3/16 in. thick, and mounted on chassis of about 30 h.p. and upwards, have given most effective protection and service. According to latest reports, the German military cars are fitted with a device for dealing with any wires stretched across the road. This consists essentially of two vertical rods curved at the top and provided with cutting edges so as to catch and sever any such wires.

The wet weather experienced in September has not been an unmixed blessing for the Allies, for though there is little doubt that it has been the cause of the capture of considerable German motor transport, it has also hampered their own motor services, which have also been hindered by broken bridges. Even before the roads were bad, however, the Germans, in their retreat after the battle of the Marne, lost a big lot. Mr. Richard Harding Davis, describing his experiences, stated that for 20 miles only, along the road he traversed, abandoned automobiles of all sorts were scattered. Some had broken down, some had run out of gasoline, some had been smashed by the Germans to prevent their falling into the hands of the Allies, while others had been run over embankments for the same purpose.

The imports of gasoline into Great Britain during August are instructive, for they amount to 12,820,000 gallons as compared with 6,336,100 gallons during August of 1913. Moreover, the overpowering successes of Russia in Galicia have also deprived Germany of one of her principal sources of gasoline and naphtha products. Already the Russian Government has sent engineers to Galicia to study the question of the gasoline supply there. At the time of writing there is every reason to believe that resulting shortage of gasoline is causing anxiety at the German headquarters, for, owing to the enormous wastage among their horses (disease has also unquestionably broken out among the German horses in Belgium), motor transport is indispensable to them, and the result of its absence would result in almost indescribable suffering to their field armies.

Already the American heavy truck industry is beginning to benefit, and this directly at the seat of war, for the Belgian Government, after consultation with the British War Office, ordered three hundred Overland cars, which it is claimed is the largest order placed by any government for any car. All these trucks are now in active service at the front.

As will be seen from the figures already given, the number of commercial trucks in Belgium is comparatively small, and consequently the ordinary touring car has been called upon for very varied duty. At the beginning of the war there was no time to alter any bodies, and these cars were used for transporting all sorts of material—troops, ammunition, food or fodder. But since then the Belgians have had time to fit some of their larger chasses with a small, light type of low-sided truck body, practically a shallow box, capable of carrying anything and everything. But the private car has also been of great assistance to the Germans, and it is beyond question that under the protection of the Red Cross or Belgian uniform the Germans have effected some marvelously daring reconnaissances. In one case, with its occupants dressed in Belgian uniform, a German car actually penetrated into Antwerp itself and got clear away again.

According to *The Daily Mail*, General Joffre recently had a very narrow escape. He was being driven by the famous French racing driver, Boillot, along a road which the Germans seemed to have known he would traverse. They, therefore, laid an artillery ambush accordingly, and as soon as the car reached the portion of the road covered by the German guns, shells fell all around. One fragment "as large as a teacup" struck the bonnet, but neither the General nor his driver were injured, and Boillot, at full speed, got away before the guns could fire again.

It is necessary, however, to utter a word of warning against the amount of nonsense and exaggeration that is being talked about the influence of motor transport. For instance, *The Daily Telegraph*, after pointing out that, when a quarter of a million of men were concentrated at Sadowa in 1866, and afterwards a similar number were brought together for a short time at Gravelotte, it was thought that the limit had been reached, stated that in the recent events 800,000 Germans could have only been brought together and rushed into France, thanks to the motor lorry. Doubtless this is, in part, true, but it must not be forgotten that, compared with the times of Sadowa and Gravelotte the armies of both sides today have a veritable network of railways at their back. In the time of the Austro-Prussian and Franco-German wars the use of railways for military purposes was a comparatively new thing, for it was only in 1859 that the Austrians for the first time were surprised to see regiments of French troops de-trained at Magenta.

A British Army Service Corps Traveling Motor-Repair Workshop Which is Drawn by Tractor

CORRECTING ERRONEOUS AMERICAN IMPRESSIONS REGARDING PETROL-CAN SHORTAGE AND THE OLYMPIA SHOW

A report has appeared in an American contemporary that many motorists in Great Britain are hoarding petrol cans, and that this and the requisitions of cans in large quantities by the army has caused a shortage tending towards bulk storage. This, however, is scarcely correct. While it is generally thought that bulk storage will undoubtedly in time be much more widely adopted than at present, there is no such shortage of cans. At the outbreak of the war there was a tendency for private motorists to hoard petrol, but that has long passed away.

The same journal is also in error in stating that the European War will not result in the abandonment of the annual shows to be held at Olympia in November. Car and cycle car and motorcycle shows have definitely been ruled out, although it is quite conceivable that, if circumstances permit, they may be held at some later date. At present, however, the big building, which is the scene of these annual shows, is in the hands of the authorities, who are using it for the accommodation of German prisoners.

CO-OPERATIVE TRANSPORT MAKING HEADWAY

The scheme for co-operation in transport that was suggested some time ago in the pages of the *Commercial Car Journal* seems catching on more than ever in England. Already we have had to record one group of societies in the south of England starting co-operative motor services, and now the same movement is in evidence in the eastern counties of England. During a meeting recently called to discuss the matter, some instructive figures were given of the running of the motor vehicles belonging to the Stratford Co-operative Society. Their first purchase, which was a two-ton Commer car, has been run at a cost of 3.9 cents a mile (taking 2 cents as equal to a penny). This, of course, includes depreciation and all charges.

German Soldiers and Sailors Loading Up a Daimler Lorry With Timber

These men are German prisoners at the detention camp at Camberley, who are marched out daily into the surrounding woods, under an armed guard, to fell and load timber used for cooking, heating, etc.

A FOUR-WHEEL-DRIVE TRACTOR TEST

In view of the important work that is being done by four-wheel driving tractors in France, more particularly in artillery transport, a description of the actual performance of a Schneider machine, which has already been illustrated in these pages, as recounted by M. Eugène Brillié—well known as the designer of the Paris motor 'buses, which are now doing such excellent service at the front—before the British Institution of Mechanical Engineers, is of more than ordinary instructiveness.

In the tractor itself all four wheels are driven by pinions, with internal racks secured to each of the wheels, and giving a reduction of fifteen to sixty-two, the pinions themselves being mounted on a countershaft with universal joints arranged coaxially with the steering axes of the stub axles; indeed, the pinion shafts themselves run in bearings carried by the stub axle forgings. These countershafts are driven by bevel gears, having a reduction ratio of thirteen to forty-six teeth.

The following are the further particulars of the transmission:

	1st.	2d.	3d.	4th.
Speed in m.p.h. (1000 revolutions)	1.8	3.5	5.9	10.6
Ratio of speeds	1	1.97	3.3	6
Calculated efficiency	80	80	80	80
Tractive effort in tons	2.9	1.5	0.90	0.49

The fact that steering is effected by both wheels enables this machine to be turned in a circle of only 42 ft. 7 in. outside diameter.

To give the necessary flexibility for traveling over rough ground, the front ends of the two front springs are connected by a compensating lever, and since the loading platforms are located at both ends, the load on back and front wheels can be adjusted and equalized.

Vehicles of the British Transport With the Expeditionary Force

The left view was taken at La Ferté sous Jouarre, showing a Hallford and a Halley. The right view was taken between Meaux and La Ferté sous Jouarre, and illustrates a Hallford belonging to Messrs. Robertsons, the well-known marmalade makers

Further main features are as follows:

	Feet.	Inches.
Length over all	19	0.4
Width over all	6	10.2
Wheelbase	11	1.9
Wheel track	5	8.8
Wheel diameter	3	3.37
Engine:		
Bore		4.91
Stroke		5.51
Horse-power at 1000 r.p.m.		40
		Tons.
Weight, empty		5.4
Maximum load		1.9
Weight, in running order		7.3

The following table gives the particulars of the working of the machine over good and bad roads:

Good. Bad. Roads. Coefficient of Traction. 44.09 lb. per ton. Gradient per cent.	88.18 lb. per ton. Gradient per cent.	Load carried 1.9 ton. Total load 7.3 tons. Tractive Effort. Tons.	Gear.	Speed Miles per hour.	Total load 16.5 tons. Load hauled 14.6 tons. Load carried 1.9 ton. Tractive Effort. Tons.	Gear.	Speed Miles per hour.
level	....	0.15	Fourth	12.43	0.45	Fourth	10.56
2	level	0.3	Fourth	12.43	0.9	Third	5.9
4	2	0.45	Fourth	12.43	1.35	Second	4.04
6	4	0.6	Third	7.15	1.8	First	2.18
8	6	0.75	Third	7.15	2.25	First	2.18
10	8	0.9	Third	6.21	2.7	First	2.18
12	10	1.05	Second	4.04		Capstan	
14	12	1.2	Second	4.04		Capstan	
16	14	1.35	Second	4.04		Capstan	
18	16	1.5	Second	4.04		Capstan	
20	18	1.65	First	2.18		Capstan	
25	23	1.99	First	2.18		Capstan	
30	28	2.4	First	2.18		Capstan	

As our readers know, the Schneider is fitted with a capstan that can be operated through four different gear sets, affording speeds of 11.8, 23.6, 39.4 and 70.8 in. a second, but only the first and second speeds appear to be of practical use, and with them the capstan can give a tractive effort of about 3 tons with four turns of rope. This rope is 1⅜ in. in diameter, weighing just under 2 lbs. 1 oz. to the yard, and has a breaking strength of 7.4 tons.

The tractor equipment consists of 60 yds. of hemp rope, with a spliced hook at one end, wound on the box cover of the capstan; steel extension ropes, 22 yds. long, for hauling from distances of over 55 yds. (with these ropes distances up to 109 yds. can be reached; these extension ropes are wound at the back of the seats); pulley tackle, enabling the strength of pull to be doubled; wedges and spikes for anchoring the tractor, non-skid chains, two portable ramps or bridges for crossing trenches, tool equipment, including a handspike, crowbar, shovel, pick, chains, blocks, etc.

In the operations during the gigantic battle of the rivers, the Germans found the automobile vastly useful for rapidly altering their positions and rapidly reinforcing their right wing. In all the series of engagements representing this gigantic battle there is reason to think there was nothing larger than a 11-in. howitzer used. The 42-centimetre (16½ in.) siege guns were at the time in Belgium, being moved up against Antwerp, and it appears that they are of Austrian make, having been produced by the Skodawerke, of Pilsen, which will be known to many of our readers as makers of road transport vehicles, more particularly one or two "trains" somewhat on the lines of the Alden-Sampson in America, though some of the heavy forgings for these weapons came from the Witkowitz steel works in Moravia.

Light Express Van Employed by the Post Office Authorities in Testing the Main Telegraphic Cables Throughout England

It is a W. and G. du Cros. The photograph was taken outside Birmingham

EMERGENCY BODIES—A FEW POINTERS IN THEIR DESIGN

AT PRESENT in Europe there is a considerable tendency towards what may be called the emergency type of body. Now that things are in the melting pot of war, the demand, for instance, for delivery vans to take the place of those commandeered may offer better advantages than a taxi-cab. Again, people are lending their private cars to be converted into amublances for the duration of the war, and in some cases have even lent their cars for helping the delivery work of tradesmen whose horses have been taken for the army. Factors like these all militate towards the production of a type of body for this sort of emergency work, and as the writer has lately had to design such ambulance bodies for the Red Cross Society he ventures to think that the essentials of such designs may be of interest to others. That is the whole point—the essentials; when you have gotten at the essentials of your design it is half done.

What, then, are the essentials of an emergency body? To my mind they are: (1) Suitability to the intended work; (2) generally cheap construction; (3) applicability to the widest possible range of chassis; (4) and in all probability quickness of possible manufacture.

As to the first point, little need be said; it is a matter for the individual designer to meet the individual case; he alone can judge.

The second requirement may to a great extent be fulfilled by the employment of simple joints such as the lap joint in preference to, let us say, the stump tenon, and it is also very largely by the employment of standard fittings and standard scantling that production cost can be kept down. Instead of a body requiring ironing up with comparatively expensive smith work, why not have a form of construction that can be strengthened with the ordinary angle irons such as one can buy anywhere; and instead of sawing and planing up timber, why not use what is ready cut? It is in the machining that a lot of the money goes.

Perhaps the question of adaptability to any and every chassis affords the greatest difficulty, though of course for some emergency bodies the question does not arise, as they may be required for one particular make of chassis, yet it often happens that a design has to be produced suitable for any and every make, and it is in such a case that lists of chassis on the market (like those published by *The Commercial Car Journal* with their comprehensive particulars and dimensions, prove particularly valuable.

The universal emergency body will have to clear the back wheels whatever their position. Therefore, it must either be narrow enough to come well within the narrowest chassis wheel track, or it must be of the well shape (the well being similarly narrow), or the whole floor of the body must amply clear the top of the wheels when the springs are deflected to their maximum. Therefore, one must assume the largest size of wheel and the greatest amount of spring play allowed. In

a "universal" body it is no use paddle-boxing the wheels, because of the variable wheelbase with which one has to deal, let alone the undesirability of increasing the cost.

If the body is for lighter types of chassis again we are faced with an infinite variety of chassis frame up-sweep over the back axle, and undoubtedly the simplest way to meet this difficulty is to make the bottom sides perfectly straight, and resting on the chassis frame at the back end and on a cross bolster at the front, such bolster being exactly the height of the up-sweep. The bottom sides, too, must be so dimensioned for the smallest space between the springs allowed in any chassis.

The amount of importance attached to possible rapidity of construction must, of course, be estimated by the individual requirements of the case, but should it be necessary, there is no reason why an emergency body with "packing case" finish should not be knocked up in half a day, provided no fancy joints are called for, and standard angles in stock can be used.

HORSE VS. AUTOMOBILE—LESS TIME AND LOWER COST

The writer has recently come across some instructive figures showing the cost of horse haulage in a seaside town in Great Britain. For a one-horse dray the daily working cost amounted to $3, inclusive of driver's wages, maintenance, and all other charges, and $4.12 for a two-horse dray. On the distances travelled this works out so that the cost very seldom falls below $0.20 a mile for the one-horse dray and $0.26 a mile for the two-horse dray. Yet everywhere motor trucks are doing this work, at a much less expenditure of time, at from $0.13 to $0.17 to the mile.

SOME INSTRUCTIVE BRITISH WORKING COSTS

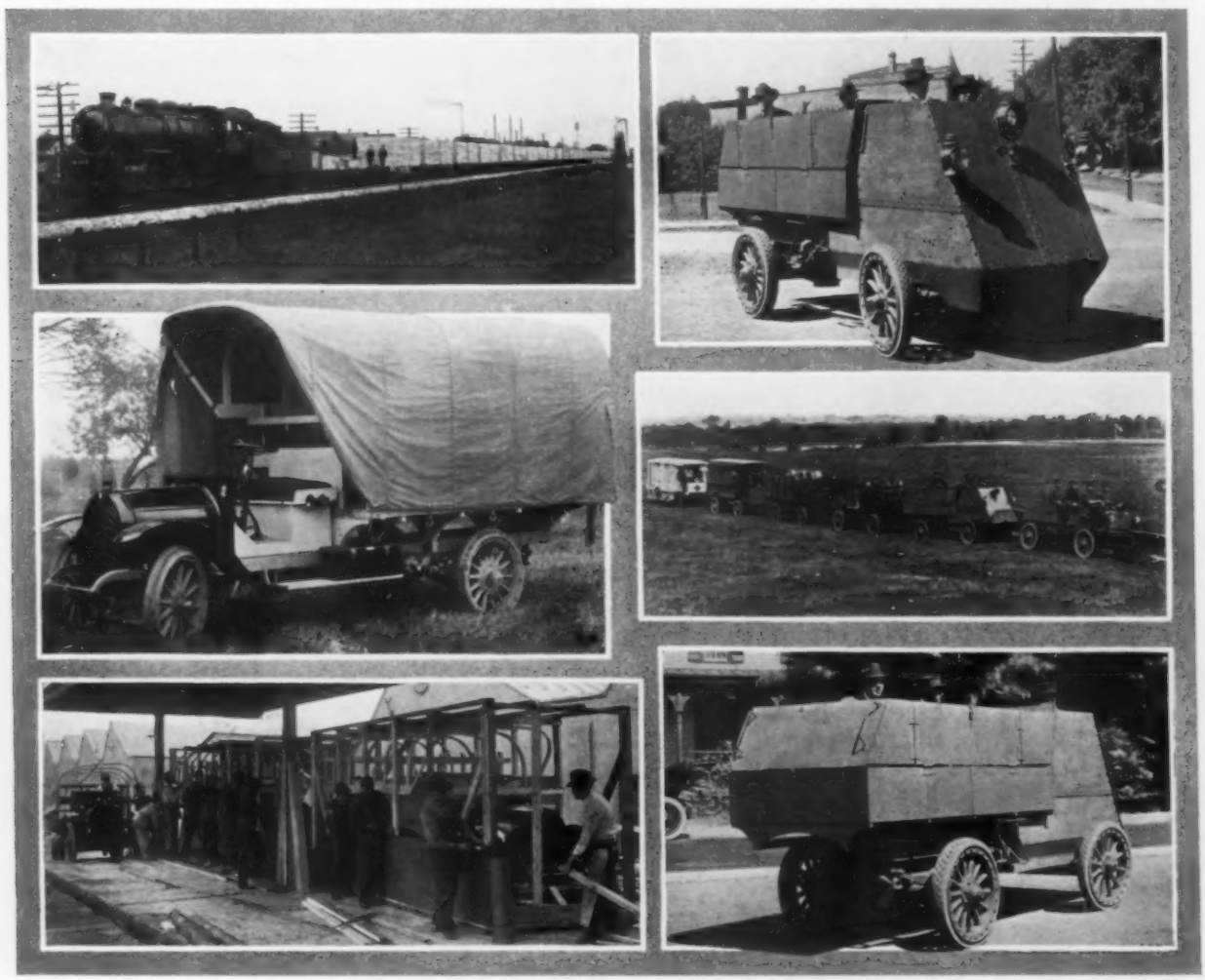
The figures of working the ten motor omnibuses owned by the Sheffield Corporation Tramways Department in Great Britain are just available, and show that the aggregate miles covered amount to 214,775. Taking 2 cents as equal to 1 penny, the total revenue averaged $.204 for a mile, while the cost worked out to $.17558 a mile. These figures may be taken as typical of the operating costs of a three-ton truck on regular work involving frequent short stops.

Running Charges

Traffic Expenses—		
Wages of drivers and conductors	$.04686	
Cleaning and oiling 'buses	.01006	
Other traffic expenditure	.00874	
		$.06566
General Expenses—		
Salaries of staff	$.00264	
Other expenditure	.00396	
		$.00660
Repairs Account—		
General repairs and maintenance (including tires)		$.02442
Power Expenses—		
Gasoline		.03682
Total running charges		$.13350

Standing Charges

Interest and sinking fund	$.00964	
Income tax	.00204	
Renewals fund (depreciation on omnibuses	.03040	
		$.04208
Total working expenses		$.17558



Jefferys and Autocars to be Used by Warring Nations

Column left, top: A trainload of fifty Jeffery one and a half ton motor trucks leaving the factory at Kenosha, Wis., for Jersey City, N. J., en route for Europe. Center: A one and a half ton Jeffery as it will appear in the war. Lower view: Boxing the fifty trucks at the factory. Column right, top and bottom illustrations: Two views of the armored Autocar furnished for European War service. Center illustration shows additional Autocar war equipment, including officers' roadsters, armored cars with machine guns in place, ammunition, food and gasoline-conveying trucks, and the Red Cross ambulance donated by the Autocar Company and its employees.

A SUMMARY OF THE MOTOR TRADE IN EUROPE

By OUR FOREIGN CORRESPONDENT

NOW that the first shock of war is over it is possible to obtain a definite view of the motor trade in Europe, and, free of panic or undue enthusiasm, collect the salient facts from which it is reasonable to deduce the future with some degree of probable accuracy.

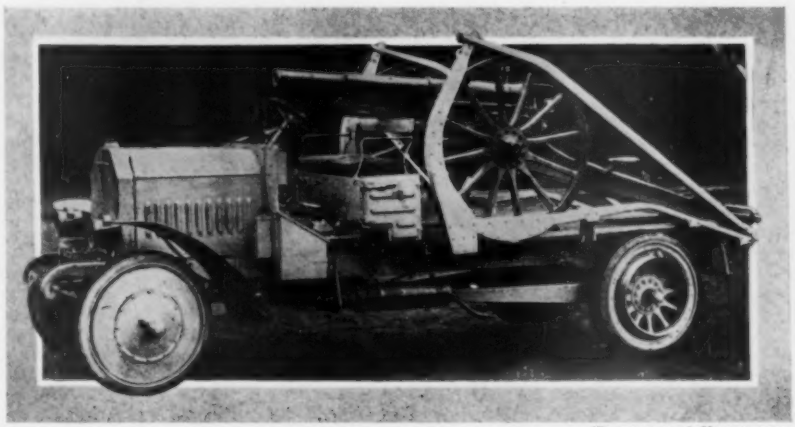
Generally speaking, for the time being the private motor-car trade is dead; nobody is buying, but the war has created a very great demand for commercial vehicles in the countries at war. Of these, however, Great Britain is the only one capable of carrying on regular manufacture, and all the manufacturers cannot meet the urgent demands of the government for more cars for military work, especially vehicles of the three-ton subsidy type. Orders of private customers cannot be filled, unless they invest in some size of truck not at present touched by military requirements. The seizure of so many commercial motor vans and trucks has, however, left big gaps which have to be filled, and though business men are buying nothing that can be dispensed with, private firm orders, as distinct from government contracts for commercial cars, are coming in, though this factor is not encouraged by the timid and selfish action of some of the banks, which are still hanging back and making money very tight. The drain on the horse supply, too, is having its effect, though up to the present time this has not been as large a factor as was generally expected.

But the demands on the heavy motor trade do not stop here, for some big orders are offered from abroad, notably from Russia, which is a heavy buyer, and may buy still more if her armies become more established on the German roads. In Russia itself, of course, commercial cars are not as yet manufactured.

At the time of writing, Italy, as a neutralized state, is somewhat handicapped by the laws of contraband, though whether Italian neutrality will last is another matter. In spite of all contradictions, I know as a fact that Italy is mobilizing heavily on her northern frontier, while on the other side of the frontier Austrian troops are being brought up in force.

No business is doing in France, though a certain amount of manufacturing is going forward—but manufacturing for purely military requirements. Certain works, such as the De Dion Bouton at Puteaux and the Berliet works at Lyons, have been militarized—in other words, taken under control of the army authorities—and have been turning out material only for the French Government. Firms that in normal times touch the pleasure cars, such as De Dion Bouton, Clement-Bayard and others, are now engaged exclusively on the heavier branch, or else on aeroplane work, gun carriages, and motor searchlights, etc., while the Alda works are engaged in part manufacture of artillery shells. In some few works the very few men left are only able to keep pace with the demand for spares. The very few German-owned works in France have in general been seized, the Mercédès repair works at Puteaux being an example; these are now occupied by the Artillery Construction Department.

No one in Europe outside of Germany knows much of what is going on within her borders; you on your side of the Atlantic are probably better informed, but it is known that trade is practically at a standstill, and that what is doing in any branch of the motor business is purely on government account. The same applies to Austria.



UNDERWOOD & UNDERWOOD

Showing Method of Transporting British Field Pieces by Means of Motor Trucks

UNDERWOOD & UNDERWOOD

British Armored Motor Car, Which Took Part in the Futile Defense of Antwerp, Standing Beside the Antwerp Cathedral

As so many motor works are in the north of France, which, in common with Belgium, have been ravaged by the German troops, it is generally thought that for some time after the war is over the French and Belgian industries will be handicapped in getting under way and turning out complete cars. Accordingly, there is a movement in the British industry to assist, and it is suggested that British factories should help French and Belgian firms by manufacturing certain parts to accelerate production of the complete article, and this at a cost no more than covering expenses. In ordinary times such a move as this, placing as it does sentiment first and business afterwards, would seem utterly unbelievable, but whether or not it is possible in the present circumstances yet remains to be seen.

When trade and production is resumed and the individual customer buying, it is thought that the reduced means of most people will lead to a cheaper form of car, and great hopes on this score are entertained by manufacturers of what in the United Kingdom is known as the light car as distinct from the cycle car—a vehicle relying on moderate first price and its low running expense, especially on tires, owing to its small size.

TRACTORS AND TRAILER USED IN STOCK YARDS

REALIZING that the motor truck or tractor, is but a part of the equipment required to solve the problem of transportation of material and that in simply substituting the motor truck for the horse a comparatively small gain is accomplished, the Mercury Manufacturing Company, Chicago, Ill., has entered the field of special haulage and handling machinery.

With a competent force of engineers, backed by a well-equipped machine shop, they not only manufacture and sell tractors and trucks, but can also design, build and install a complete system of conveyors, elevators, tractors and trailers, exactly fitted to handle the material in the most economical manner.

As an example of a more or less complicated case, which is being handled by them, we will describe briefly the manure disposal and cleaning system which they have recently installed in the Union Stock Yards of Chicago.

Up to the present time the work has been done with four-wheeled dump carts, requiring forty teams of horses, valued approximately at $24,000. The carts were loaded in the pens and hauled to a dump at the south end of the yards. The dump was in the form of an elevated platform, made necessary because of the fact that the carts must be elevated and dumped into a freight car, and the incline leading to the dump was steep on account of the small space available.

The average haul is ½ mile, and, of course, the horses were idle during the loading and dumping process; also, all day Sunday, Monday and Wednesday, or three-sevenths of the time.

With the present system installed, horses are eliminated and replaced by tractors, trailers, snow plows, sweepers and power dumping apparatus.

In the particular installation, which we will describe, the Bulley tractor is employed. This tractor presents many new and interesting features, and is particularly adapted to this work on account of its compactness and extremely short turning radius, made possible by the three-wheel type, and the fact that the engine is situated over the rear axle, which also aids in giving the remarkable draw of nearly 1½ tons, or over one-half the weight of the completed machine.

The power is derived from a four-cylinder heavy duty motor.

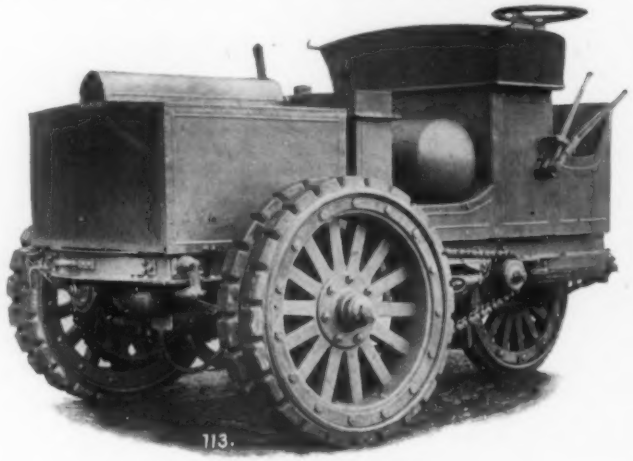
The rear wheels are of hickory, and carry 39x4 in. dual block tires.

The front wheel is mounted on an axle to which it is fastened, so that the axle revolves with the wheel, and between two heavy cast steel beams, in each of which is a stationary hub holding the ball bearing on which the axle revolves.

The bearings work between plates, preventing lateral motion. The bearings at the front and springs and plates are connected to a ball-bearing cone, which is larger in diameter than the wheel, so that the center of the wheel is very nearly in line with the ninety-eight ¾-in. balls, upon which the cone works, the balls being held by a stationary cup fastened to the frame of the vehicle.

A dust washer is provided, also means preventing the cup and cone from separating.

Two sets of brakes are provided—the emergency which acts on two drums, one on each jack shaft, by means of a hand lever at the right of the driver's seat—this brake may be set—and the service brake, actuated by a pedal. The service brake is applied from the foot pedal to a shaft just back of the rear axle with a quick adjustment at the point of attachment.



The Bulley Tractor

Used for pulling trailers in the stock yards at Chicago. These trailers are shown in another illustration

The drums are 16 in. in diameter, and the bands 3 in. wide, giving an effective brake area of about 280 sq. in.

The Bulley tractor may be had in either electric or gasoline type, and with four wheels instead of three, to meet the various requirements of road conditions, turning radius, fire risks, etc., so that the general outline remains the same.

The trailers of this installation are also of the three-wheel type, and weigh when loaded 1 ton each. When hitched up in trains of twelve they track perfectly, as will be seen from the cut. It is possible, and in fact is, daily practice to negotiate a 12-ft. alley, turn at right angles to right, and again at right angles to left, so that the first and last few cars are running parallel, while the middle is traveling at right angles to each end.

The two main wheels of these trailers are of wood with steel band, mounted on Hyatt roller bearings. The third wheel is of iron, of the castor type, also mounted on roller bearings—the power being used—and pivoted on a cup and cone ball bearing of special design. It was necessary to go into this refinement so that the trailers may be pushed easily by hand when being coupled up into trains, or put into the elevator described later.

Chains are provided at the front and rear of each trailer. These chains are fastened at the corner of the cart, and have a combined hook and ring at the intersection of each pair.

The Trailers

A number of the trailers are here shown loaded and winding around the alleys of the stock yards. They track so well that no trouble is experienced

Probably the most interesting unit of this installation is the dumping elevator, three of which will be used in the complete equipment. The elevator consists of a structural steel tower, mounted on flanged wheels, and it is self-propelled along rails parallel to the train of freight cars to be loaded. The machine is electrically driven, power being taken from three overhead wires by means of trolley poles (not shown) and lead to the controller box at the left of the operator, through a metal conduit.

The elevator receives a trailer, lifts, dumps and delivers it on the train platform automatically. It is driven by its own power in both directions along the track, so that a number of freight cars may be loaded by the same elevator without having to move the cars.

The motor shown at the left of the operator is of the induction type and develops 10 h.p. at 900 r.p.m., driving by worm and gear, a shaft extending across the frame. A chain from this shaft drives the elevator in either direction—according to the position of the switch above the operator's left hand and the clutch, the lever of which is at the right. The operator is standing with his left foot on the quick-acting brake, which will stop the apparatus almost instantly. On the same shaft on which is mounted the clutch, etc., for driving the machine on the rails, is keyed two pinion gears engaging with two larger gears, one of which drives each of the parallel vertical chains—to which a wire rope leading to the cage is fastened.

These chains always move together, the object being to give a positive and limited motion to the cage, and also to retard its motion at the top and bottom. The upper chain sprockets are adjustable to compensate for stretch in chain, and for adjustment of cage's vertical movement—which, of course, corresponds exactly with the distance from the top of the upper sprockets to the bottom of the lower sprockets—in this case 14 ft. 6 in. The cage is adjusted for position by a twin buckle between the wire rope and the bridle connecting it to the chains.

The cage is a framework of steel, having three tracks to accommodate the wheels of the trailers, working against wheels fast-

The Elevator

Used for elevating and dumping the trailers, one at a time, into the waiting freight cars

ened to it, and rolling in two vertical channels. The trailers are pushed into position on the cage, and striking against spring bumpers at the rear, are adjusted to position by a slight depression in the middle rail and the front wheel. The motor is started and the cage gathers velocity as the wire rope fastening changes from a horizontal to a vertical motion in going around the upper sprockets the first quarter of a revolution of these sprockets—when it has reached the maximum speed of 60 ft. a minute, allow of dumping from sixty to seventy trailers per hour, depending upon the condition of the material to be dumped, some freeing itself more readily from the carts than others.

As the motion of the cage is reversed the trailer is righted and assumes its normal position on the rails.

The two main tracks of the cage are pivoted at the front and as the cage raises, two legs drop down. When the cage approaches the bottom, these legs striking elevate the rear end of the tracks so that the trailer is expelled onto the platform. As the trailer leaves the cage the wheels strike levers, tripping the rails so that the cage is ready to receive the next cart.

The tractor leaves the dump with a train of from eight to twelve empty trailers, distributes them, and returns with an equal number of loaded carts.

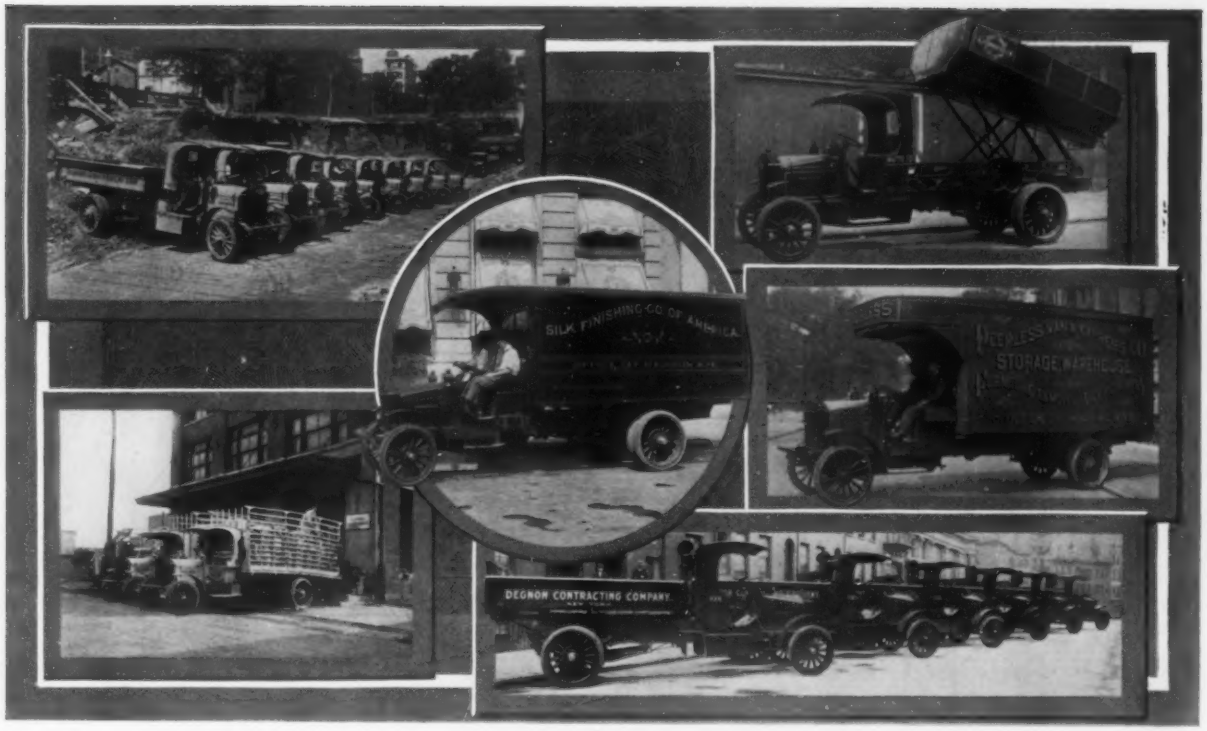
It will be noted that it is always possible to have plenty of work ahead of the shovel men, which was not formerly the case, and that the trailers are so much lower than the old dump carts, that they are loaded with much less exertion on the part of the men.

It has been demonstrated by a side to side run, without the knowledge of the workmen, that a single tractor with twenty-four men, including the driver, helper, elevator operator, etc., will do the work of twenty-two teams of horses and thirty-five drivers, dump and shovel men.

The equipment was invented by G. W. Bulley, president of the Mercury Manufacturing Company, and is completely covered by patents issued, allowed or pending.

The Fleet of Frank & Seder Department Store, Pittsburgh

These cars, on pneumatic tires, cover the hilliest sections of the city. One Lippard-Stewart has covered in a few months 7305 and another 7819 miles, in this service



Pierce-Arrow Trucks Operating Around New York City

At the present, over 240 Pierce-Arrow trucks are employed in this vicinity. They are used in 39 different businesses: 35 being in brewery service, 32 in contractors' work, 26 by wholesale grocers, 16 by masons, 12 in hauling sand and gravel, and 10 in handling coal. Other users are handlers of dry goods, meat, asphalt, ice cream, and baggage.

Estimated Operating Cost of Commercial Cars, Based Upon 300 Working Days*

FIXED CHARGES	OPERATING EXPENSES	25 miles per day	30 miles per day	35 miles per day	40 miles per day	45 miles per day	50 miles per day	55 miles per day	60 miles per day	65 miles per day	70 miles per day	75 miles per day	80 miles per day
1500 Pound Delivery Car—	Gasoline at 18c (12 miles per gallon)	$ .3750	$ .4500	$ .5250	$ .6000	$ .6750	$ .7500	$ .8250	$ .9000	$ .9750	$1.0500	$1.1250	$1.2000
Depreciation on $1600.00	Oil at 30c (250 miles per gallon)	.0300	.0360	.0420	.0480	.0540	.0600	.0660	.0720	.0780	.0840	.0900	.0960
8 years ..... $ .666	Repairs, Painting and Overhauling	.1500	.1800	.2100	.2400	.2700	.3000	.3300	.3600	.3900	.4200	.4500	.4800
Interest at 6% on	Tires at .0534 per mile (pneumatic)	1.3350	1.6020	1.8690	2.1360	2.4030	2.6700	2.9370	3.2040	3.4810	3.7380	4.0050	4.2700
$1600.00 ..... .3200	Driver at $3.00 per day	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
Insurance ..... .1200	Total OPERATING cost per day	4.8900	5.2680	5.6460	6.0240	6.4020	6.7800	7.1580	.753260	7.9240	8.2920	8.6700	9.0460
	Fixed charges	1.1066	1.1066	1.1066	1.1066	1.1066	1.1066	1.1066	1.1066	1.1066	1.1066	1.1066	1.1066
Total per day $1.1066	TOTAL COST per day	5.9966	6.3746	6.7526	7.1506	7.5086	7.8866	8.2646	8.6426	9.0306	9.3986	9.7766	10.1526
One-Ton Truck—	Gasoline at 18c (10 miles per gallon)	.4500	.5400	.6300	.7200	.8100	.9000	.9900	1.0800	1.1700	1.2600	1.3500	1.4400
Depreciation on $2250.00	Oil at 30c (200 miles per gallon)	.0375	.0450	.0525	.0600	.0675	.0750	.0825	.0900	.0975	.1050	.1125	.1200
8 years ..... $ .9375	Repairs, Painting and Overhauling	.1650	.1980	.2310	.2700	.2970	.3300	.36300	.3960	.4280	.4620	.4945	.5280
Interest at 6% on	Tires at .0187 per mile (solid)	.4675	.5620	.6550	.74800	.8420	.9350	1.0280	1.1220	1.2150	1.3080	1.4020	1.4950
$2250.00 ..... .4300	Driver at $3.00 per day	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
Insurance ..... .1666	Total OPERATING cost per day	4.1200	4.3450	4.5685	4.7980	5.0165	5.2400	5.54635	5.6880	5.9105	6.1350	6.3590	6.5830
	Fixed charges	1.5341	1.5341	1.5341	1.5341	1.5341	1.5341	1.5341	1.5341	1.5341	1.5341	1.5341	1.5341
Total per day $1.5341	TOTAL COST per day	5.6541	5.8791	6.1026	6.3321	6.5506	6.7741	6.9976	7.2221	7.4446	7.5691	7.8931	8.1171
Two-Ton Truck—	Gasoline at 18c (8 miles per gallon)	.5625	.7650	.7875	.9000	1.0150	1.1250	1.2380	1.3500	1.4630	1.5750	1.6875	1.8000
Depreciation on $2950.00	Oil at 30c (185 miles per gallon)	.0406	.0487	.0567	.0648	.0730	.0810	.0852	.0973	.1055	.1135	.1215	.1298
8 years $1.2800	Repairs, Painting and Overhauling	.2381	.2839	.3343	.3810	.4286	.4752	.5240	.5718	.6191	.6664	.7137	.7620
Interest at 6% on	Tires at .0265 per mile	.6610	.7950	.9300	1.0600	1.1900	1.3250	1.4580	1.5900	1.7240	1.8560	1.9880	2.1195
$2950.00 ..... .5900	Driver at $3.00 per day	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
Insurance ..... .2062	Total OPERATING cost per day	4.5022	4.8946	5.1076	5.4058	5.7096	6.0072	6.3052	6.6091	6.9116	7.2109	7.5107	7.8113
	Fixed charges	2.0242	2.0242	2.0242	2.0242	2.0242	2.0242	2.0242	2.0242	2.0242	2.0242	2.0242	2.0242
Total per day $2.0242	TOTAL COST per day	6.5264	6.9188	7.1318	7.4300	7.7308	8.0341	8.3294	8.6333	8.9358	9.2351	9.5349	9.8355
Three-Ton Truck—	Gasoline at 18c (6 miles per gallon)	.7500	.9000	1.0500	1.2000	1.3500	1.5000	1.65000	1.8000	1.9500	2.1000	2.2500	.....
Depreciation on $3500.00	Oil at 30c (160 miles per gallon)	.0500	.0600	.0700	.0800	.0900	.0938	.1033	.1125	.1220	.1313	1.408	.....
8 years $1.4580	Repairs, Painting and Overhauling	.3125	.3750	.4375	.5000	.5625	.6250	.6875	.7500	.8125	.8750	.9375	.....
Interest at 6% on	Tires at .0375 per mile	.9350	1.1250	1.3110	1.5000	1.6900	1.8750	2.0625	2.2250	2.4275	2.6250	2.8075	.....
$3500.00 ..... .7000	Driver at $3.00 per day	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	.....
Insurance ..... .2500	Total OPERATING cost per day	5.0475	5.4600	5.8685	6.2800	6.6925	7.0938	7.5033	7.8875	8.3120	8.7313	9.1358	.....
	Fixed charges	2.4080	2.4080	2.4080	2.4080	4.4080	2.4080	2.4080	2.4080	2.4080	2.4080	2.4080	.....
Total per day $2.4080	TOTAL COST per day	7.4555	7.8680	8.2765	8.6800	9.1005	9.5018	9.9113	10.2955	10.7200	11.1391	11.5438	.....
Four-Ton Truck—	Gasoline at 18c (4.5 miles per gallon)	1.0000	1.2000	1.4000	1.6000	1.8000	2.0000	2.2000	2.4000	2.6000	2.8000	.....	.....
Depreciation on $3950.00	Oil at 30c (125 miles per gallon)	.0600	.0720	.0840	.0960	.1080	.1200	.1320	.1440	.1560	.1680	.....	.....
8 years $1.6458	Repairs, Painting and Overhauling	.4150	.4580	.5825	.6140	.7470	.8300	.9130	.9970	1.0780	1.1620	.....	.....
Interest at 6% on	Tires at .500 per mile	1.2500	1.5000	1.7500	2.0000	2.2500	2.5000	2.7500	3.0000	3.2500	3.5000	.....	.....
$3950 ..... .7900	Driver at $3.00 per day	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	.....	.....
Insurance ..... .2833	Total OPERATING cost per day	5.7250	6.2300	6.8165	7.3100	7.9050	8.4500	8.9950	9.5410	10.0840	10.6300	.....	.....
	Fixed charges	2.7191	2.7191	2.7191	2.7191	2.7191	2.7191	2.7191	2.7191	2.7191	2.7191	.....	.....
Total per day $2.7191	TOTAL COST per day	8.4441	8.9491	9.5356	10.0291	10.6241	11.1691	11.7141	12.2601	12.8031	13.3491	.....	.....

*Figures Furnished by Stegeman Motor Car Company

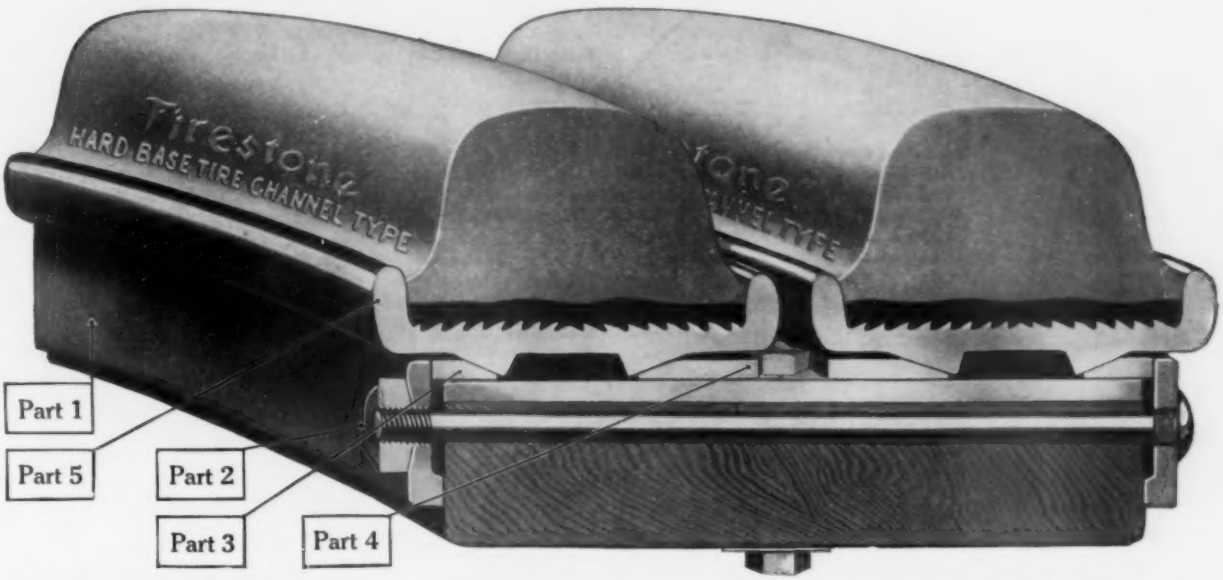
Firestone

Truck Equipment

THOUSANDS of Truck Owners everywhere recognize the practical economical efficiency of the Firestone Truck Service.

This service has been still further extended by Firestone Removable Rim Equipment which has been developed to such perfection that any driver can change a tire in a few minutes.

Study the cross-section view and get the fundamentals which explain Firestone working efficiency.



PART 1—SIDE CLAMPING FLANGE is continuous, holding the wedge ring in place. It cannot be forced out of contact by any blow on the rim as it is a separate part, fully protected from all strain of side thrust—an exclusive Firestone feature.

In dual equipment the clamping side flange and the wedge ring are alike on both sides of wheel. In single wheel equipment angle clamps are substituted on the inside, doing work of both flange and wedge ring. These single wheel angle clamps are permanently located at each bolt head, and further removal is unnecessary.

PART 2—FASTENING NUTS AND BOLTS Convex inner surface of the nuts draws up to concave surface of the flange. This gives effect of ball and socket joint. Clearance between nuts and the overhanging rim, permits the use of ordinary brace wrench. Heat treated bolts of standard carriage bolt dimensions are used. In dual wheels they are applied at a loose fit, allowing 1-16 inch play in bolt holes, so that rims can be drawn evenly to center band. This floating bolt is a distinctive Firestone feature insuring evenness of tire wear.

PART 3—WEDGE RING This is the locking feature of the fastening device. The driving of the wedge rings against the surface of the rim seats the tire positively and permanently. The wedge rings project beyond the felloe band, taking up tolerances in width of wheel.

PART 4—CENTER BAND An important exclusive Firestone feature. Insures an even drawing up of tires and trueness of wheels. It is removable. Allows taking off of tires from outside of wheel. Three centering bolts hold band in place. When pressure is applied by outside flange to outside wedge ring, it is equally applied to inside wedge ring. This action forces both tires against the locked center band, holding tires over wheel center. Load equally distributed on all bearings.

PART 5—UPTURNED SIDES of the rim increase its strength two-thirds over flat rim bands and protect the union between the hard and soft rubber. The overhang of the channel takes all the impact shocks when running against curb, etc. The force of all side blows is distributed downward through the channel to the felloe and spokes.

STOP PLATE To avoid any chance of creeping or circumferential slipping of the rims a "Stop Plate" is applied to the S. A. E. band, fitting a corresponding key way in the tire rim. This stop plate also relieves the wedge rings of excess strain in sudden starting or stopping.

ALL TYPES—ALL SIZES For every condition of service. All Firestone tires are made to fit standard S. A. E. wheels, and can be applied to such wheels without wheel work no matter what make of S.A.E. tire has been previously used.

In every large city—every trucking center there is a Firestone Branch, fully equipped to render every wheel service. But where we have no such equipment there is the unanswerable argument of Firestone simplicity!

Firestone Tire and Rubber Company, Akron, Ohio—Branches and Dealers Everywhere

"America's Largest Exclusive Tire and Rim Makers"

Pneumatic Tires, Truck Tires, Pleasure Electric Tires, Carriage Tires, Cycle Tires, Fire Apparatus Tires, Rims, Tire Accessories, etc.

Non-Freezing Solutions for the Cooling System

To the Editor:

We desire to ascertain all information possible as to the best non-freezing solutions for commercial car radiators.

Pure Oil Company.

Minneapolis, Minn.

In order to prevent the water of the cooling system from freezing during the winter, it is necessary that some ingredient be added to the water to lower its freezing point. Table I gives the freezing points of the several solutions generally used in different proportions. A number of other solutions are in use, but they are either too expensive, injurious to the parts of the cooling system, will not flow properly or do not take on and lose heat rapidly. The following paragraphs give briefly the advantages and disadvantages of each of the substances generally used.

Alcohol and Glycerine

Either of the alcohols may be used in conjunction with glycerine and this probably makes the best anti-freezing solution of any. Table I shows only the freezing points of the wood alcohol-glycerine solutions. The denatured alcohol-glycerine freezing points are considerably higher. It should be noted about this solution, however, that there is no practical method to telling how much alcohol the solution contains, as a hydrometer is useless unless calibrated for a particular percentage of glycerine. The only thing to do therefore is to add small quantities of alcohol each day and get an approximate solution. The glycerine does not evaporate, hence does not have to be replaced.

Ethyl or Grain Alcohol (Denatured)

This alcohol is not quite so volatile as wood alcohol, that is it does not evaporate so easily or quickly, hence it does not have to be replaced as often. On the other hand, for the same percentage solution, it does not lower the freezing point as much as wood alcohol. On the whole, however, if the freezing point is not to be so low, it is preferable to wood alcohol. Denatured alcohol can be purchased at drug stores, paint stores or hardware stores for about $.60 per gallon.

Methyl or Wood Alcohol

Wood alcohol produces a lower temperature, for the quantity added to the water, than any of the substances, except calcium chloride. Great care should be taken, however, to test the strength of the solution as wood alcohol has a low boiling point and evaporates rapidly. The sense of smell should not be relied on as even a very weak solution will, especially when warm, give off a very strong odor. If alcohol solutions are used, either wood or denatured, a hydrometer should be used daily during cold weather to test the strength. A percentage table with specific gravities usually accompanies the hydrometer. Table III gives the percentage of the two alcoholic solutions with corresponding specific gravities.

Glycerine

Glycerine, when used by itself must be pretty strong in order to produce the desired result. When it is strong enough for this purpose, it is also strong enough to attack the rubber in the hose connections and for this reason it is far preferable to use the alcohol with it and reduce the proportion of glycerine. In using a glycerine solution, it is necessary to thoroughly cleanse the radiator and water jackets of any residue of crystals from calcium solutions previously used, as this residue will thicken and cloud the glycerine solution. A very strong glycerine solution becomes gelatinous and will not circulate freely, especially in thermo-syphon systems, where its use is not recommended. One advantage about a glycerine solution is that when it does freeze, it does not freeze solid, but becomes a sort of spongy mush which does not do much damage.

Calcium Chloride

Calcium chloride is a very effective cooling agent, but unless the chemically pure article is used there is danger of corrosion of the metal with which it comes in contact. A convenient way to prepare the solution is to first make a "saturated solution" of the calcium chloride and water, that is, mix with a quantity of water warmed to 60 degrees F. all the calcium chloride the water will completely dissolve, and use equal parts of this saturated solution and pure water in the cooling system of the motor. If chemically pure calcium chloride is used no trouble will result. Chloride of lime should be avoided. Crude calcium chloride retails at about $.08 or $.10 a pound, while the chemically pure article is worth about $.25 in small quantities. If the chemically pure article cannot be obtained, the commercial substance can be made fit for use by neutralizing the acid. This may be done by adding ammonia or soda ash gradually to the solution until the blue litmus paper no longer turns red when moistened with the solution.

TABLE I.
Anti-Freezing Solutions
Calculated by David Wilbur Horn, Ph.D.

Material	Amount in fluid ounces to be added to one gallon of water									
	10	20	30	40	50	60	70	80	90	100
	Freezing Point									
Glycerine	29	25	21	17	13	9	4	0	-4	-8
Ethyl or Grain Alcohol. (denatured)	27	22	18	13	8	4	0	-6	-10	-14
Methyl or Wood Alcohol	25	19	12	5	-5	-18	..	..	..	..
Calcium Chloride (ounces)	27	21	15	5	-10	-38	..	..	..	..
Half Wood Alcohol, Half Glycerine	25	15	-13	..	..	..	..	..	..	..

TABLE II.
Table of Freezing Points of Alcoholic Solutions by Percentage of Alcohol

	Percentage of Alcohol by Volume						
	0	10	20	30	40	50	60
Ethyl or Grain Alcohol. (denatured)	32	24	14	6	-2	-10	-18
Methyl or Wood Alcohol.	32	18	4	-10	-23	-37	-50

TABLE III.
Table of Specific Gravities of Alcoholic Solutions

Sp. Gr.	1.00	.99	.98	.97	.96	.95	.94	.93	.92
Per Cent Denatured Alcohol	0	7½	15½	23	30	38	46	53	60
Per Cent Wood Alcohol	0	8	17	25	33	41½	49	57½	65

Salt

Sodium chloride or ordinary salt may be used as an anti-freezing agent. A saturated solution—that is, a solution in which the water has dissolved all the salt it can—will freeze at about 0 degree. The disadvantages about a saline or salt solution is that it has an electrolytic action on the brass and iron parts of the cooling system.

Oils

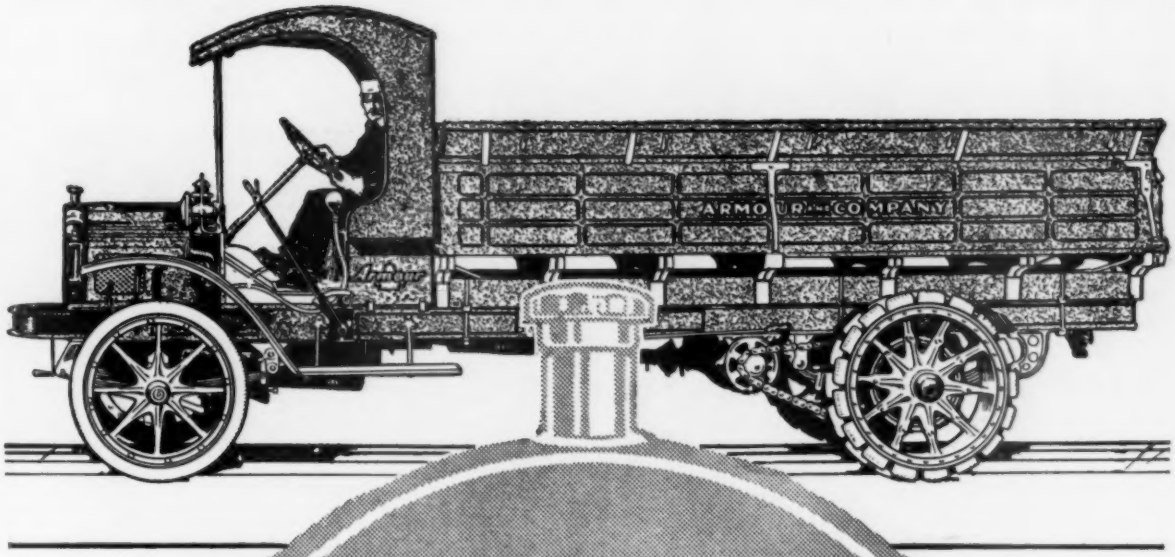
Light oils are occasionally used instead of water in the cooling system. Such oils should be very light and thin, and before putting the oil in the system all water should be taken out, as it is obvious that oil and water will not mix. Run the motor for a few minutes after drawing off the water, and the heat will evaporate what little water is left. Oil should only be used where the radiator and circulating pump are very effective, as the oil is slow to run and takes on and gets rid of heat very slowly. The fan should never be disconnected, nor should any portion of the radiator be covered when using oil. Oil will attack rubber hose and gaskets and should not be used in connection with them or with thermo-syphon systems.

THE VALUE OF THE INTELLIGENT "FOLLOW-UP"

One of the manufacturers of motor trucks who profits by a rather complete and excellent form of co-operative "follow-up" is the Federal Motor Truck Company, of which Mr. H. P. Sigwalt is the advertising manager.

There has come to the Editor's desk in the past few days fourteen separate and distinct pieces of mail matter in the form of booklets and folders.

Not only does this show the maximum co-operative spirit between the sales and advertising departments of that very successful company, but also is ample evidence of the co-operation that agents receive from the Federal Motor Truck Company, because these various pieces of printed matter cover practically all the subjects of vital interest to both the man who sells and buys motor trucks.



FAMOUS PACKING COMPANIES OWN GREAT WHITE FLEETS

RECENT purchases by Armour & Company have brought the total of their White Trucks to sixty-six, operated in thirty-five cities throughout the United States.

Armour & Company purchased their first White Truck in 1911, and have steadily added to their White equipment during the last three years, until now their White Fleet is numbered among the large installations of the country.

White Trucks are being used to solve the transportation and delivery problems of many of America's great packing companies. Besides Armour & Company, White Truck Fleets are owned by the Cudahy Packing Company, John Morrell & Company, Swift Canadian Company, Cleveland Provision Company, and many others.

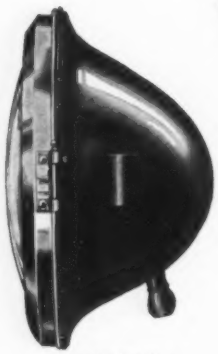
In transporting the perishable products of these companies, absolute reliability is essential. White Trucks are giving this kind of service, day after day, and year after year, in all lines of business.

THE WHITE COMPANY
CLEVELAND

BOTH IN QUANTITY AND VALUE OF PRODUCTION, THE LARGEST MANUFACTURERS OF COMMERCIAL MOTOR VEHICLES IN AMERICA

Indiana Lamps

GAS ELECTRIC OIL



11½" Bullet

The best, strongest, most dependable lamps ever put on a motor truck

This may seem like a mighty strong assertion, but it is based on facts. INDIANA LAMPS have been undergoing the severest kind of usage on many of the leading trucks of the country and the service they have given and are giving justifies the above statement. There is no getting away from actual facts that are being proved every day and the superiority of INDIANA LAMPS for motor trucks is one of these daily proved facts.

No. 22

The INDIANA line is complete, and comprises every style, shape, size, and finish for which there is a demand. It does not matter what your requirements may be, you can find an INDIANA LAMP that will meet them better than any other you might select.

INDIANA LAMPS are designed and made especially for motor truck service. They possess the extraordinary strength, sturdiness and stability so necessary for such service. The materials of which they are made and the method of making are such as to make them so strong and dependable that truck makers who are seeking quality in lamps cannot help but make their choice from the INDIANA line.

No. 24

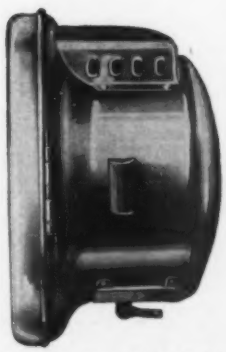
The electric line, comprising Bullet Lamps, 13", 11½", 10" and 8" in diameter, all equipped with Ediswan Bayonet sockets and plugs, focusing-type assembly, made of extra heavy gauge metal, one-piece construction with double-strength glass in front, and they are all of the close-coupled type which is so popular this season.

Parabolic Reflectors are absolutely true and these are silver-plated and hand-burnished.

The Lunar Gas Headlight comes in 8 and 10 inch sizes. Close-coupled type, very compact, large diameter, short length, interchangeable parts.

Oil Lamps include side and tail lights, having exclusive features. Suitable for all types and sizes of trucks. Strong, attractive, dependable.

All lamps are packed in strong cartons. Shipments are prompt. Prices very moderate. Send for illustrated folders.



Lunar Gas Headlight

INDIANA LAMP CO., Connersville, Ind.

Predicting the Shop's Requirements

By CHESTER S. RICKER, M.E.

TOO often the writer has seen the purchasing department blamed for something which was entirely outside of their jurisdiction. On this account it seems that something ought to be done to more closely co-ordinate the efforts of executive and production departments with the purchasing.

The writer will endeavor to give an idea of a very simple system which he devised for one automobile plant. The system only needs the full consideration of the management to make it a success as experience has proven. By means of it, the purchasing department knows at all times how the shop is running with respect to the schedule and can reduce or increase the orders for material as the conditions require.

This system only required the time of one clerk for about 15 minutes each day and was kept where the General Manager and the purchasing department could refer to it at all times. As the curves were kept on thin paper they could be blue printed and the various departments given copies either once per week or per month. The knowledge that each department would have to show what it was doing all the time and how close it came to the required mark was shown at every point. It also shows whether any one of the departments is holding up one of the others and in this way serves to increase the standard or *espirit de corps* of the factory organization.

The hardest job that the purchasing agent has is to keep the material on hand as small as possible consistent with uniform production and he can only do this by knowing at every moment just where the factory stands as in regard to the prearranged schedule. This simple curve sheet will give him the information at a glance.

In Service

When in service it is very easy to keep this curve. Every day a report is made from each department stating what cars have left there between 4 o'clock on the previous day and 4 on the one in which the record was taken. At this hour each day the clerk who keeps this table goes to each department and collects the report. This report is easily kept by the foremen of each department by providing them with a pad of report sheets properly ruled up and making it compulsory that they put the car number on this each time a car goes out of the department. The clerk merely takes off the top sheet after it is signed by the foreman and cars going out of that department after the sheet is taken are recorded as having been removed on the next day.

ABC AUTO TRUCK CO.
TOTAL DAILY PRODUCTION
DATE 3/28

		TOTAL
FIRST ASSEMBLY	344-345-346 347	4
ROUGH TEST	332-334-337	3
PAINTING	311-312	2
FINAL ASSEMBLY	305-308-309	3
FINAL TEST	302-303	2
SHIPPING	301-302-303-304	4

Daily Production Record

The data on this sheet is compiled from the department reports. From this the entries are made on the ledger and curve sheet.

How the Reports Are Used

The clerk brings the reports to the purchasing department and there checks off the various car numbers, giving the date in each instance, on the car ledger which is kept for this purpose. He then makes the necessary additions to the curve and his work for the day is done. The entire report and addition to the curve in practice does not take the boy or girl delegated to this duty more than 15 minutes each day.

What the Curve Shows

The curves not only show what the factory is doing but also bring both to the purchasing and executive departments' conditions which are not right and permit them to be adjusted before they become too bad.

ABC AUTO TRUCK CO.
DAILY DEPARTMENTAL PRODUCTION REPORT

		TOTAL
FIRST ASSEMBLY	301-302-303 304	4
ROUGH TEST		
PAINTING		
FINAL ASSEMBLY		
FINAL TEST		
SHIPPING		

DATE 3/14

FOREMAN Mike Donovan

Production Report

Made out by the department foreman each day at a certain hour

LEDGER OF PRODUCTION — ABC AUTO TRUCK CO.

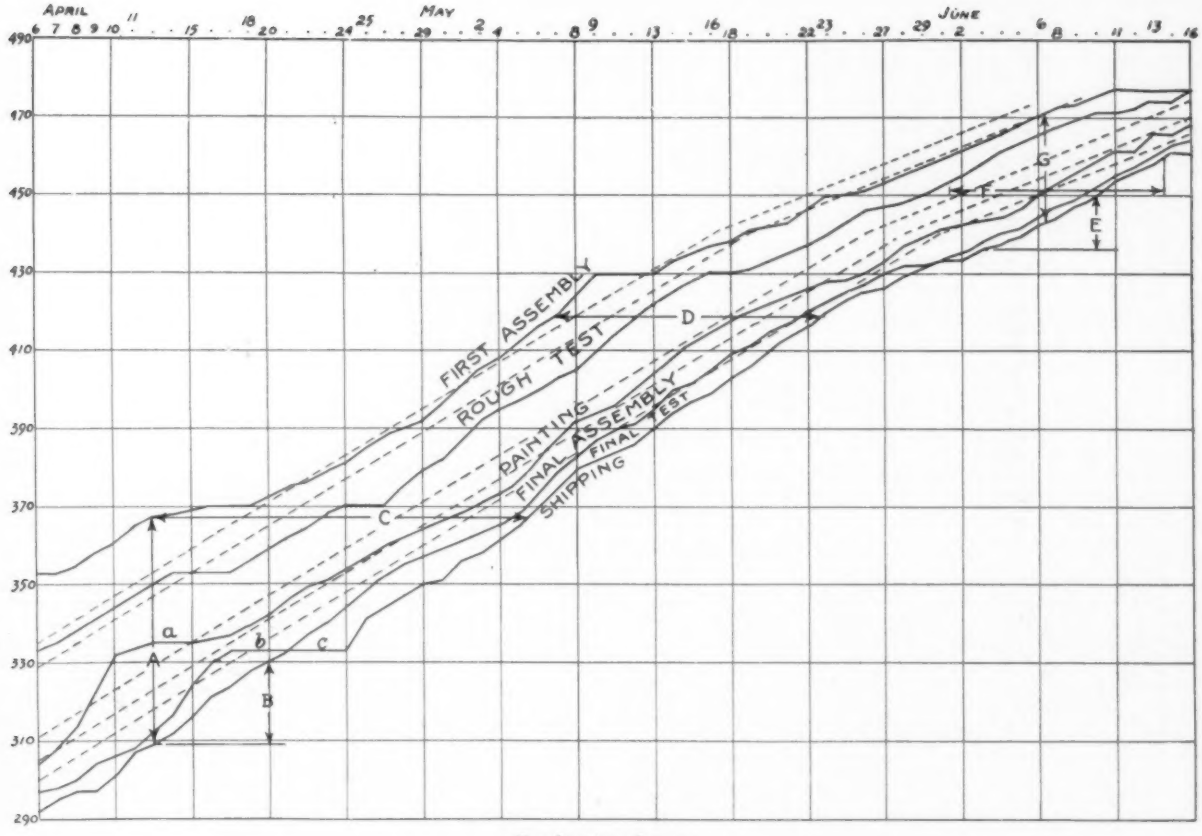
DEPARTMENT	CAR NO.	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320
FIRST ASSEMBLY		3/14	3/14	3/14	3/14	3/16	3/16	3/16	3/17	3/17	3/18	3/18	3/18	3/18	3/18	3/19	3/19	3/19	3/20	3/20	3/20
ROUGH TEST		3/17	3/18	3/18	3/17	3/18	3/17	3/19	3/19	3/20	3/20	3/21	3/20	3/20	3/21	3/24	3/21	3/24	3/24	3/24	3/25
PAINTING		3/23	3/24	3/24	3/23	3/24	3/24	3/24	3/25	3/26	3/26	3/28	3/28	3/26		3/31	3/30	3/31	3/31		
FINAL ASSEMBLY		3/26	3/27	3/26	3/26	3/28	3/27		3/28	3/28	3/30	3/31	4/1	3/30							
FINAL TEST		3/27	3/28	3/28	3/27	3/31	3/30		3/31	3/31											
SHIPPING		3/28	3/28	3/28	3/28	3/31	3/31		4/1	4/1											

Note #307 drawn out by Engineering dept for experimental work
" #314 Engine trouble requiring repairs
FROM 3/14/1 TO

Production Ledger

Showing the progress of each car through the different operations of production, from first assembly to shipping

At all times the curve shows in a very clear way the number of cars in production, and the time that it is taking to process them. If the standard curves are set at the beginning it is very easy to show whether you have the available factory space for a given production. For example the standard curves show that you expect to have not over thirty-five cars in process at any time, this is the maximum vertical distance between the top and bottom production lines. For processing these cars 12 days are required whether you are running through three per day or two as in the case of the first and second sets of curves respectively. In the latter case, however, the car production is limited to twenty-four in process as a standard. It will be seen that while these are not reached in practice as would be indicated



Production Curves

Showing the standing of each department with regard to the number of cars put through

by the curve, they may be very closely approximated if the management and the purchasing department work hand in hand.

Diagnosis of Conditions

Judging from the conditions as they apply in the beginning of the curve it is evident that the First Assembly had been held up from lack of material a couple of weeks before we see the curve and as they are trying to bring up the average production by pushing this department above the regular schedule line. Their desire to make up time, however, may lead them astray unless some check is put on it and as will be seen at A the management have become aware of this condition and production was cut down to three cars for the week from April 13th to 18th. From that time until the 18th of the next month they held very close to schedule.

On account of the greater production of the first assembly the testing department were unable to cope with the increased production and soon took on an average of 6 or 7 days to test which was 4 days more than necessary. These same conditions can be clearly shown in each department and as a matter of fact if trouble has occurred in a previous department the following department heads can be prepared for the slump or super production which ever it may be when it follows.

As will be noted a bad condition exists at A where there are fifty-eight cars in production when there ought only to be thirty-five. This condition was corrected as rapidly as possible by slowing down the first assembly and increasing the production of the finished cars. The production per week at this point is twenty-one instead of eighteen which is the standard. It will also be noted that the time of production is excessive measuring 19¼ days at C. By watching the production curves the conditions can be improved as is proven at D where the time of production is almost normal, 13½ days.

On the last week in June it was desired to close the factory for one week's inventory, and so the production was set for 475 cars of that model, it was decided to stop first assembly about the 8th of June so that these cars would be finished and shipped by inventory time. Hence the standard curve becomes flat at this point.

With the material on hand the 18th of May, it was decided to reduce the output to two cars per day so as to use this up about the 8th of June instead of before. Looking over the actual production curves, it will be seen that the average shipments per week has been reduced to thirteen, E, and that the time of production has been carried below the standard set, namely, eleven at F instead of 12 days. The cars in production, G, have been brought down to twenty-eight.

With the help of one of these charts, the purchasing department always keep their finger on the pulse of the shop and know when to bring in fresh supplies. It eliminates your own problems and allows that department to concentrate on the introduction of goods from the outside. This scheme of course applies to such truck factories as largely assemble their chasses. As this is quite customary in those factories where there is a large production, this kind of a curve will greatly facilitate the work.

A COAL BODY FOR SEVERAL SMALL ORDERS

An interesting body for coal dealers is built by the Monahan Vehicle Company, Providence, R. I. This body is so arranged that it can handle a single delivery of 8000 lbs. or eight small deliveries of 1000 lbs. each, each of these latter in different grades of coal or not. It has transverse partitions dividing the body into eight compartments, each compartment holding the same amount of coal. It is not necessary to weigh each compartment separately; for, when a compartment is leveled at the top, it contains the proper weight of coal. Each compartment may be discharged separately.

DOORS ON FRONT OF BODY TO HANDLE LONG PIECES

To facilitate the handling of long pieces the Whitwood one and a half ton truck has its express body built with hinged doors at the front on both sides of the driver's seat which, when opened, permit long pieces to project forward past the driver's seat.

Another commendable construction on this machine is the projection of the filler tube of the gravity-feed gasoline tank through the side of the seat riser, saving much time in filling the tank.

ANNOUNCING

The REPUBLIC
1500 POUND MODEL

The latest addition to the Republic line.

Another Honest Truck at an Honest Price.

PRICE $995.00 (With Express Body).

Brief Specifications:

Continental Motor Bosch Magneto 3-Speed Sliding Gear Transmission
Stromberg Carburetor Pressed Steel Frame Dry Plate Clutch
124-inch Wheel Base 3 in. front, 3 in. rear Firestone Tires
Rear Axle Internal Gear Drive with entire load carried on solid forged axle.
Driver's Cab or Bow Top or Canopy Top extending over driver's seat—Special.
With 35 x 5 Pneumatic Tires—Special.

The production of this model in large volume enables us to set a new, an honest and a correct price value on motor trucks of this capacity.

WE SEEK HIGH GRADE CONNECTIONS IN UNOCCUPIED TERRITORY.

Republic Motor Truck Co.
ALMA, MICHIGAN.

REPUBLIC FOR SERVICE

REPUBLIC MOTOR TRUCK Co.

ALMA, MICH.

The Honest Truck at an Honest Price

The fastest selling Truck in America

REPUBLIC construction and parts command respect because of their quality. A truck that is so carefully designed, excellently built and which embraces such standard units as Continental Motor, Timken Axles, Bosch Magneto, Stromberg Carburetor, Russell Full Floating Jack Shaft, Covert Transmission, Standard Cone Clutch, and Firestone Tires are certain to give service that delights the owner and creates profit for its dealers.

There are no better Trucks than the REPUBLIC. They are used for all business—absolutely standard everywhere.

You can recommend the REPUBLIC to your customer as a truck that will save money in his particular business.

"The Honest Truck at an Honest Price."

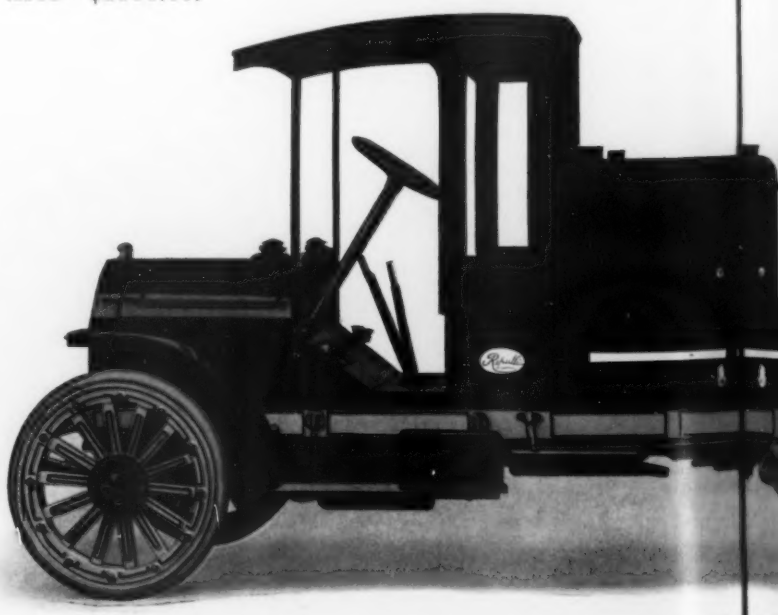
You should, in justice to yourself, send at once for our concise literature and see the color illustrations and Chassis of the REPUBLIC models, noting the design of the Chassis as a whole and understanding how we have taken the truck users' point of view in the little and big things that make up the really efficient and dependable Truck.

We believe that you will agree with us that the REPUBLIC Chassis is the very expression of road and load fitness. The question of a suitable Body is quite as important as the rugged Chassis. It means time-saving, money-making and trade-bringing to the user. We build Bodies to meet any and every requirement.

CHASSIS

Model C Chassis—2,000 pounds capacity, 124-inch wheel-base, 35x3 front tires, 35x4 rear tires—$1350.00.

Model L Chassis—2,000 pounds capacity, 144-inch wheel-base, 35x3 front tires, 35x4 rear tires—$1350.00.



Republic Model D—$14

REPUBLIC FOR SERVICE

REPUBLIC MOTOR TRUCK Co.

The Honest Truck at an Honest Price

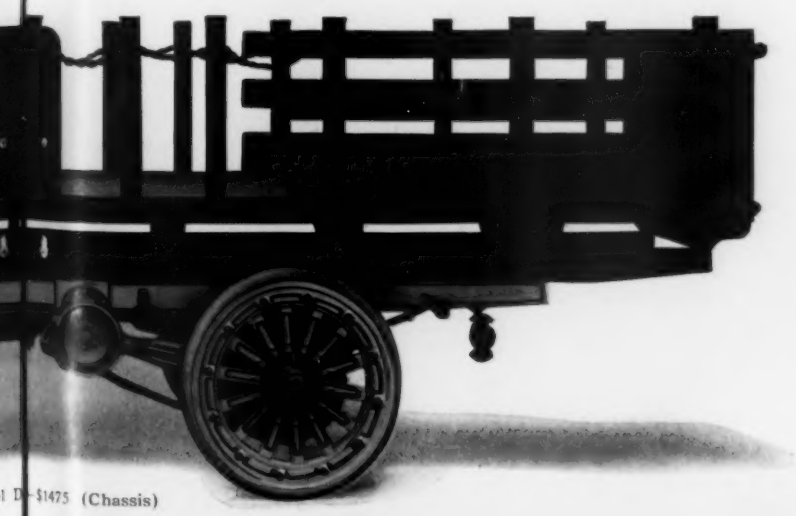
The fastest selling Truck in America

The Republic Motor Truck Company is one of the rapidly growing concerns in the industry and the REPUBLIC is the fastest selling Truck in this country. This is due to the prime fact that the REPUBLIC is recognized as being a Truck of unusual capabilities and quality and that it has set a new standard of prices for trucks of this capacity.

CHASSIS

Model M Chassis—3,000 pounds capacity, 124-inch wheel-base, 35x3½ front tires, 35x5 rear tires; extra heavy 12-leaf rear springs and auxiliary cross-spring over rear axle—$1475.00.

Model D Chassis—3,000 pounds capacity, 144-inch wheel-base, 35x3½ front tires, 35x5 rear tires; extra heavy 12-leaf rear springs and auxiliary cross-spring over rear axle—$1475.00.



l D—$1475 (Chassis)

The REPUBLIC is pre-eminently serviceable. It is the standard Truck which dealers can sell with least effort. Our present dealers call the REPUBLIC a self-seller.

The only Truck which can be entirely satisfactory to its owner is the one which shows him a saving day after day and which proves economy month after month due to minimization of repairs.

The secret of the wonderful success of REPUBLIC Trucks is two fold: the use of proven standard parts and the wise design of the Truck as a whole.

Get in line now, while the selling season is on. We believe that you should investigate the truck situation thoroughly now, as it is assuredly becoming a big industry. Identify yourself with us and reap the profits that will certainly follow.

REPUBLIC FOR SERVICE

REPUBLIC MOTOR TRUCK CO.

ALMA, MICH.

Our Message to Dealers

Especially to those who are waiting for THE Truck Opportunity

The chief requisite of permanent success is to sell an honest truck at an honest price. The fruits of so doing are satisfied customers, efficient service, profitable operation, increased business and greater profits.

There, in a nutshell, is the secret of the phenomenal success that has attended those wide-awake and energetic dealers who now sell the REPUBLIC Truck. They have an Honest Truck to sell—one that they know is right, that will serve well and that will save money for its owners. They have an Honest Price—one that is remarkably low for the quality involved and which affords unprecendented value. These factors, plus effort, have made success inevitable.

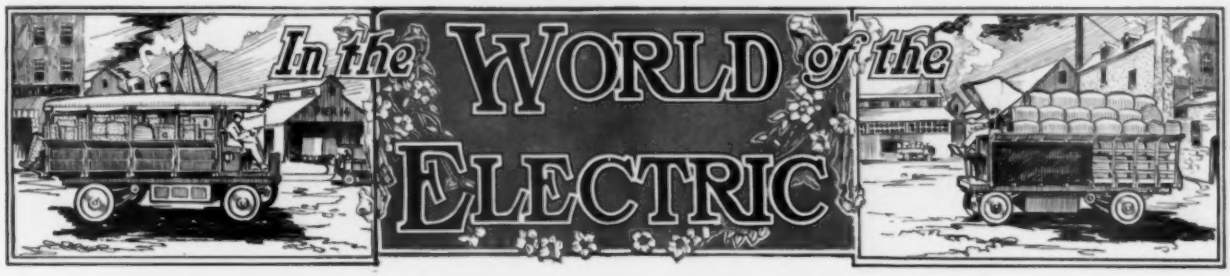
If YOU have been waiting for ***your*** Truck Opportunity—look closely and you will find it in the REPUBLIC. The three popular models, the quality and reputation of the Truck, the records it has created, the service it gives, the value it offers, the economies it effects, all point to it being the Truck of trucks for you to tie up with for permanent business success.

Let us refer you to dealers who will tell you of their experiences and how the REPUBLIC has proved to be their great opportunity in the Truck field.

REPUBLIC MOTOR TRUCK CO.

ALMA, MICH.

Republic Model L—1 Ton Truck
$1350.00 (Chassis)



Fifth Annual Convention of E. V. A. Marks Era in Electric Vehicle Industry

THE recent convention of the Electric Vehicle Association of America, at the Bellevue-Stratford, Philadelphia, Pa., was conceded to be the most successful convention yet held by the electric vehicle interests. Including the associate members, business men and visitors, nearly 450 persons attended the convention. Besides the business sessions, which were held both morning and afternoon of the three days, an elaborate program of entertainments, including vaudeville, moving pictures, a dance and automobiling to points of interest for the ladies, was provided.

New officers were elected for the ensuing year as follows: President, John F. Gilchrist, Chicago, Ill.; Vice-President, Walter H. Johnson, Philadelphia, Pa.; Treasurer, H. M. Edwards, New York City; Directors, Frank W. Smith, New York City; Charles Blizard, Philadelphia, Pa.; E. P. Chalfant, Chicago, Ill.; J. H. McGraw, New York City.

Opening Session

On Monday morning at 10 o'clock the first session was opened by an address of welcome by Mayor Blankenburg, which was responded to by President Frank W. Smith. The business of the convention was taken up immediately, and the reports of the Executive Secretary, reports of the Sections, reports of Constitution and By-Laws Committee were read, and a Nominating Committee appointed.

Following the address by the president on Monday morning at the opening session, a message of greeting from President Woodrow Wilson was read.

Appreciation was shown by a standing vote of thanks, and a message of acknowledgment was dispatched to the President.

Monday Afternoon Session

Several of the reports of the committees were held over from the morning session and occupied the first part of the afternoon. The first paper was "The Progress of the Electric Vehicle," by James H. McGraw.

P. D. Wagoner read a most interesting paper on the "European Development of the Electric Vehicle Industry."

Some statistics as to the number of vehicles in use revealed the fact that electrics were largely used for special purposes such as fire apparatus, street cleaning, garbage collection, etc. The first electric was brought out by Rafford, of France, in 1881, and the first successful commercial electric in America is credited to Riker in 1897. Many of the foreign vehicles are of light weight three-wheeled type, and the speed of nearly all trucks is higher than in America. One-half-ton vans have a speed of from 15 to 18 miles, and five-ton vehicles 7½ to 9 m.p.h.

Electrics are used to a very small extent, two-ton electric trucks being very rare in Europe, fleets of from twenty-five to fifty five-ton or even two-ton trucks being practically unknown in Germany and France. He called attention to the use of trucks in mail service.

During the discussion which followed the question was brought up as to the co-operation of the Central Station men in Europe with the vehicle makers. Mr. Wagoner stated that there was practically no co-operation and that the electric vehicle industry was not at all systematized, nearly all the vehicles being especially built for peculiar purposes in gas-car factories.

Profits From Charging

As as argument for co-operation on the part of the Central Station men, William P. Kennedy pointed out that the average price of the electric vehicle is $2600, and that its average for current is $260 a year; in other words, in 10 years the charging station receives as much from the vehicle as the vehicle maker himself.

George S. Walker, chief mechanician of the Philadelphia Fire Department, read an excellent paper on electric fire apparatus. He stated that the vehicles were most reliable, and have never failed to respond to an alarm when summoned. Cleanliness, lack of odor, etc., especially as the men have their quarters above the vehicles, were mentioned, as well as ease of operation. He suggested to the battery men heavier jars and terminals.

Vice-President Johnson, of the Philadelphia Electric, read a telegram from Mr. Edison to the effect that he could not be present.

Preston Miller, in the absence of Chief W. H. Daggett, of the Springfield, Mass., Fire Department, spoke on the efficiency of the Springfield electric fire apparatus.

The evening session brought out some interesting discussion in connection with J. Crawford Bartlett's answer to Dr. Steinmetz, which showed that there was a very great and diversified opinion on the subject of the low-priced electric.

"Special Applications of Electric Trucks" was the subject of a paper by F. Nelson Carle, of the G. V. Company, which brought out the many and diversified uses to which the electric vehicle can be readily adapted.

The Moving Picture Film—"Selling Electric Vehicles"

Those present enjoyed the film on selling electric vehicles as acted by prominent men in the industry. Many were greeted with applause as they appeared on the screen. This film has already received widespread publicity and is undoubtedly doing good work in furthering the sales of electric vehicles.

Tuesday Morning Session—A Discussion of the Low-Priced Electric

Vice-President Gilchrist, who just arrived from Chicago, presided. After the reports of the Good Roads and Education Committee, W. A. Manwaring's paper on "Power Wagon Operation in Central Station Service," which was scheduled for the afternoon, was taken up. He pointed out the efficient service which electrics were rendering the Philadelphia Electric Company, giving statistics on the number of days in service, average miles k. w. hours per mile, etc. He also called attention to special uses of electrics, in which they have greatly cut down the cost of handling electric light poles, telegraph poles, etc., but spoke of high initial cost as a drawback.

In the discussion which followed, William P. Kennedy brought out the fact that the high first cost was in every case more than offset by the increased efficiency of the organization when electric vehicles were used.

T. I. Jones then took the floor. His subject was: "A Wider Dissemination of Electric Vehicle Information." Although he had no paper, his talk on the subject more than made up for it.

George Kelly, of the Baker Electric Company, started the discussion of the morning which proved the subject of the low-priced electric to be a bone of contention. Whitten, of the G. M. C., spoke on the fallacy of demonstrations and backed up his remarks by the percentage figures compiled by his company, showing that sales were as great, if not greater, without demonstrations, and that fully 81 per cent. of those demonstrated to do not buy.

President Smith spoke in no undecided terms to the effect that he could not see why any company connected with the sale of current or current-consuming devices should supply its employes with anything but electrics.

F. C. Henderschott, Chairman of the Committee on Education of Salesmen of the N. E. L. A., extracted his paper, "Educating the Public in the Field and Use of the Electric Vehicle."

Next in number was read the paper, "A Practical Project to secure Authentic Cost of Operating Commercial Electric Vehicles," by William P. Kennedy. Mr. Kennedy read his paper in its entirety.

Next was read a report on central station co-operation by Mr. Gilchrist in the absence of W. W. Freeman, chairman of the committee.

Following this paper, H. P. Dodge read his paper on "Constant Potential System of Charging from Motor Generators."

"Trend of Electric Vehicle Manufacture" was the title of the paper by H. H. Doering, in which he compared the electric vehicle of the past with that of the present, and stated that the cheap electric has come and gone. He contended that the policy of giving the public what it wants was the only one which the wise manufacturer should resort to.

A committee, consisting of T. C. Martin, Walter H. Johnson and George Wakeman, was appointed to wire congratulations to Edison at Buffalo on the thirty-fifth anniversary of the incandescent light.

The meeting adjourned.

Third Day—Morning Session

The session opened with E. R. Whitney's report of the Standardization Committee. The discussion brought out several questions. Mr. Russell wanted to know what had been accomplished on standard ization of charging plugs, and S. V. Norton, of the Goodrich Company, on standardization of electric tires. Mr. Whitney replied that they had confined their efforts to standardization of the sizes of the plugs, not the types, their aim being to make the plugs used throughout the country interchangeable. On the tire question, he said: "We are not trying to standardize the tires themselves, but merely the methods of trying to determine tire efficiency; in other words, we are trying to establish a common language concerning tire efficiency so that comparisons can be made. Manufacturers are assisting us by accumulating data on tire performance which they are turning over to the committee."

John F. Gilchrist, who was closely associated with Edison in his early work, read the congratulatory telegram which had been drawn up by the committee and sent to Edison at Buffalo, on the 35th anniversary of the invention of the incandescent light. By vote the telegram and the record of its being sent to the great inventor was spread upon the minutes.

President Smith then announced that the membership had risen to 929, an increase of 490 members since the convention one year ago. (Applause.)

In the absence of D. C. Fenner, chairman of the Traffic Committee, the report of that committee was read by Harvey Robinson. The splendid work of this committee was commended by the president.

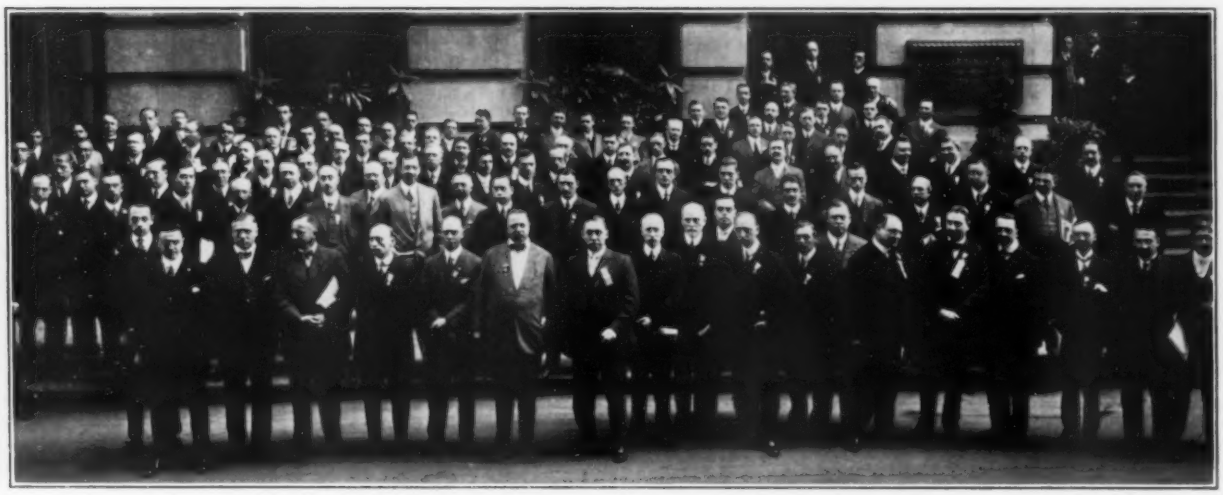
H. S. Baldwin, of the General Electric Company read his paper on the electric automobile motor, which was illustrated by lantern slides. This paper was divided into two parts, the first dealing with the early electric vehicle and its effect on motor design and the second part with modern developments. This part of his paper showed the surprising fact that the specifications of many of these early vehicles were almost identical with modern electrics.

The slides showed in detail the design and construction of present electrics. The paper as a whole was most interesting and instructive from a historical point of view.

The Discussion

At the close President Smith spoke of those present who had been long connected with the industry, and called upon Fred. M. Kimball, of Lynn, Mass., who stated that in his opinion not as a manufacturer of electric vehicles, but from a general point of view, there is a field now for a moderate-priced commercial electric vehicle. He suggested co-operation between the manufacturers and central stations, especially in smaller towns, so that manufacturers' representatives with their vehicles could go there, and the central station men would supply current, garaging facilities, etc. Much more could be accomplished by developing these latent fields than by letter writing.

William P. Kennedy then spoke of this convention as an epoch in the electric vehicle industry. Results are gratifying, when it is realized that the cheaper type of electric has been more definitely and comprehensively discussed and explained than ever before. He referred to the New York Electrical Show as proving that it is possible to market in a large way smaller types of electric vehicles and suggested that Mr. Ward, of the Ward Motor Vehicle Company, be called upon.



Some of the Members Lined Up for the Picture

Mr. Ward then stated that he believed a high grade electric car could be produced at a price which the average merchant could afford and that the manufacturer of electrics should not be in business if he cannot produce a vehicle which can be put alongside of the horse, and do the work for less money.

Day Baker spoke a few words as coming from the men on the firing line, those who have to sell the product. He suggested that all salesmen should study Mr. Baldwin's paper with special reference to the motor, the most abused part of the electric vehicle.

The Shunt-Wound Motor Discussion Showed Interest in This Subject

Following this, reference was made to the possibilities of the shunt wound motor, and the waste of power in braking the electric car mechanically, and the advantages of this motor in recharging the battery on down grades or when applied as a brake. The members were invited to see and ride in a car fitted with motors arranged for this purpose.

Mr. Carroll, of the Westinghouse Company, read T. H. Schoepf's paper on "Effects from the Utilization of the Kinetic Energy of an Electric Vehicle," in the ab-

sence of Mr. Schoepf, who was taken suddenly ill in Washington and was unable to be present.

At this point it was announced that the largest naval collier in the world, a vessel entirely electrically propelled and with special battleship loading apparatus was in the navy yard, and the members were cordially invited to visit it. The Commercial Truck Company of America supplied a 'bus to anyone who desired to visit same, and a number availed themselves of this opportunity. R. McAllister Lloyd criticised several points in the paper, while F. E. Whitney pointed out a few facts of further interest on the subject. J. P. Mallett, of the Buffalo Electric Vehicle Company, then announced that they had perfected a vehicle with shunt wound motors used for braking and regeneration purposes, and that any who were doubtful as to the hill-climbing possibilities of such shunt wound motors were invited to come downstairs and be shown by actual demonstrations on the road. Mr. Carroll in closing the discussion said that he and others would certainly be interested in seeing this machine, and it was evident that there was much interest in this problem, it being one that many makers had in mind and had been working on more or less unsucessfully for many years.

E. P. Chalfant, secretary of the new Electric Vehicle Manufacturers' Association, was then called upon, and addressed a few words to the meeting, closing with the statement that he hoped by next year to be able to report great progress and a year of co-operation between the Manufacturers' Association and the Vehicle Association. (Applause.)

Mr. Stone of the Resolutions Committee then read the resolutions of thanks and appreciation to the Mayor, the officers, the various committees, the press, the *Commercial Car Journal* for its "Daily Bulletin" and to those who had contributed to the success of the convention.

Mr. Gilchrist then added a resolution of thanks to President Smith for his untiring efforts and the resulting advancements made by the E. V. A. of A. during his administration. The resolutions were adopted unanimously. George H. Kelly further eulogized the president and his efficient work. The officers reported by the Nominating Committee were then unanimously elected.

John F. Gilchrist, the newly elected president, was then called to the platform and made a brief address, as the morning session had already been carried almost through to the time set for the afternoon session.

The Afternoon Session

This session did not begin until 2.30, owing to the length of the morning session. A. A. Nim's paper on "Calculations of Electric Motor Characteristics and Prediction of Vehicle Performance" proved to be extremely technical. In the discussion which followed R. McAllister Lloyd pointed out that this was a subject upon which very little research work had been done and was therefore all the more valuable.

The paper, "Charging Apparatus for the Private Garage," was read by J. C. Lincoln. A discussion followed which brought out the various phases of the motor generator set versus the rectifier as charging apparatus. Mr. Bartlett took exception to the average life of batteries as given by Mr. Lincoln.

A telegram of congratulation to the Association and its newly elected officers was received from Arthur Williams.

H. H. Rice, president of the Waverley Company, who just made his appearance at the Convention, was called upon to speak, and congratulated the Convention on the spirit he saw displayed, and gave some interesting figures from authentic sources on the saving shown by electric vehicles over gasoline cars.

Votes of thanks were then tendered to the electric car owners of the city who so kindly donated the use of their almost indispensable electrics for the use of the ladies for the three days of the Convention, also to T. E. Croosman, the efficient stenographer of the Convention.

Symposium on Electric Industrial Trucks

C. T. Thompson began the symposium on the electric industrial truck, abstracting the prologue which he had written. J. C. Bartlett then spoke of the industrial trucks of the Automatic Transportation Company, and pointed out that the field for these vehicles is much larger than realized by many. Figures of the Erie Railroad Company showed a total saving by the use of industrial trucks of 28 per cent. over former methods, and he claimed that the industrial truck will pay for itself in less than 14 months. He said their slogan was, "Put this truck on your payroll, and pay it the wages that you are now paying for hand labor, we will supply the truck, and will on the savings realize its cost in 3 years." He showed a series of lantern slides, illustrating the use of these trucks in many lines of business, such as handling freight on docks in railroad stations, in the handling of mail, etc. Some of these trucks are fitted with scale platforms so that each load is weighed. The controllers on these vehicles where used in powder mills, oilcloth works, etc., are oil immersed to preclude the possibility of sparks.

W. M. Buckwolter, of Pennsylvania Railroad, presented the symposium on the industrial trucks of the Elwell-Parker Electric Company, in the absence of Mr. Brown. Mr. Buckwolter being the inventor of the drive used on these vehicles. In mail handling he showed that the vehicles were saving 66 per cent. and that on an average in various classes of service they were saving their cost in from 9 to 13 months.

He suggested in closing that to give the E. V. A. the standing which it should have they should concentrate more effort upon obtaining as members large users, and pointed out that the Pennsylvania Railroad had already spent over a quarter of a million dollars in the development of the electric vehicle represented by the industrial truck.

A. Gfrorer gave his portion of the symposium on the vehicles of the C. W. Hunt Company, Inc. This paper was also illustrated with lantern slides. The discussion on the subject was then opened by Theo. Gabrylewitz, Secretary of the Team Owners' Union, who talked on the subject of the advantages of electric vehicles at freight terminals and of tailboard delivery.

This closed what was universally conceded to be the most successful convention yet held by the E. V. A. of A.

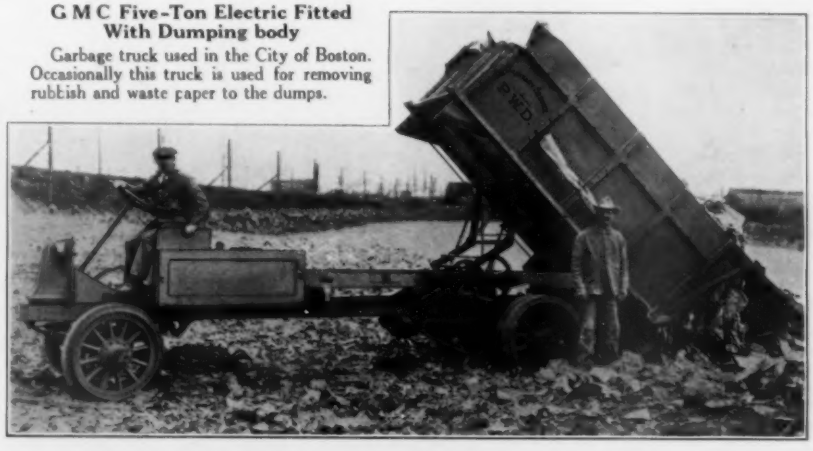
ELECTRIC TRUCK DELIVERY MOST ECONOMICAL FOR WHOLESALE CREAMERY BUSINESS

Based on an extended comparison of results with horses and his single electric truck, E. Burr, proprietor of the Burr Creamery Company, Los Angeles, considers that for work involving less than 40 miles a day, the electric truck offers the most economical delivery medium. He has been operating his one electric, a Studebaker, medium-weight truck, about 3½ years, and finds that the upkeep cost, not including driver or depreciation, or interest on investments, now averages less than $50 a month.

At present he is working gas cars on the outer territory, making the more distant parts of the city and suburban points, and usually running up a mileage beyond the capacity of the electric. The electric is used in territory within 6 miles of headquarters, and makes around 40 miles or less per day. Horses are used very close in.

G M C Five-Ton Electric Fitted With Dumping body

Garbage truck used in the City of Boston. Occasionally this truck is used for removing rubbish and waste paper to the dumps.



ELECTRIC TRUCK MAKES GOOD IN FLOUR DELIVERY

No time lost for repairs in the 15 months it has been in operation, is the record of the three and a half ton G. V. truck owned by the Capitol Milling Company, Los Angeles. It is used daily in city delivery of flour and other grain products, seldom going out without a capacity load, and averaging four loads daily. Herman H. Levi, vice-president of the company, figures that it replaces the work done by one five-ton and one three and a half ton horse wagon formerly used under contract. At the time of doing away with the contract service, the company considered the hiring of a truck, but finally determined that it was more economical to buy this electric than to hire motor-truck service for city delivery. Its experience has been satisfactory and confirms this conclusion. The electric is not used in suburban deliveries, this class of work being handed over to one of the hauling companies carrying on regular suburban service with motor trucks.

Mr. Levi says the truck averages from 40 to 45 miles per day, with thirty stops. Since buying the truck they have spent hardly anything for repairs, and drivers get along nicely without any trouble. A great advantage for their business is the cleanliness obtainable in handling their product. A man is able to keep cleaner than with horse delivery.

The ability of the truck to resist hard knocks was proven by a little accident in the garage early one morning. The driver threw the controller part way on with his knee, by accident, while adjusting the top, then he threw on the current, thinking the controller was off; the truck ran into the 12-in. brick wall of the garage, below two windows, and knocked the wall down onto the sidewalk for a space of 20 ft. The truck came through without any damage and was on the job at the usual hour, ready for service.

Capitol Milling Company Truck

Has operated fifteen months without being out of service at all for repairs. Average daily mileage is forty, making four trips, usually starting with capacity load

THE NEW ELECTRIC VEHICLE GARAGE IN NEW YORK CITY

THE use of electric vehicles in New York City, especially that of commercial cars, has increased wonderfully during the past few years. This increase in the use of electric cars has led the Exide Battery Depots Company, Incorporated, of Philadelphia, to open a large and modern garage and battery depot in New York City to take care of storing, charging, repairing and maintaining of electric vehicles. This new garage and depot is very centrally and conveniently located, being situated at 527 to 541 West Twenty-third Street, between Tenth and Eleventh Avenues.

Although the garage was opened only shortly after the first of this year, the business has rapidly developed, showing that there was a real demand for this garage in the central part of New York City. This new garage is claimed to be the largest and most completely equipped public electric vehicle garage in New York City, the space available for vehicles being over 20,000 sq. ft., sufficient space for the proper storing of more than one hundred cars. This entire space is on the ground floor, which overcomes the necessity of using elevators to raise cars to upper floors and the delays that are thereby occasioned.

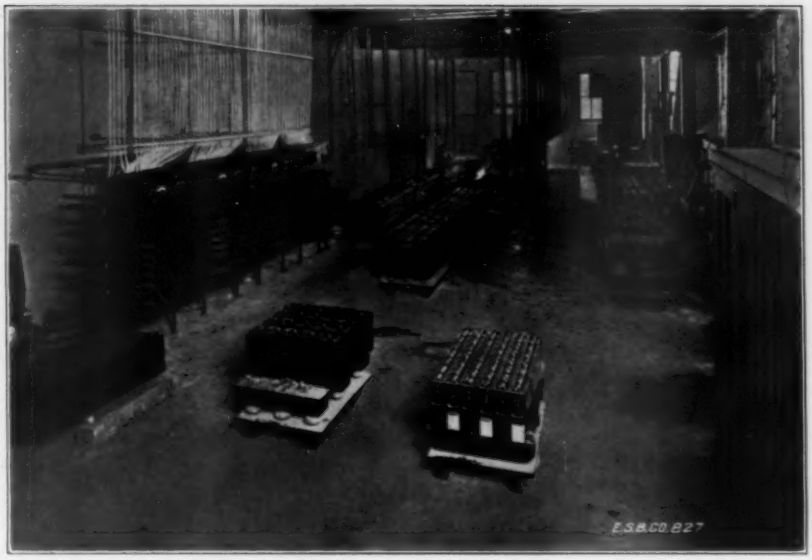
The new building is of fire proof construction, well lighted and ventilated. The floor of the garage is of concrete and sufficiently sloped to be perfectly drained and is lighted by twenty large sky lights. The most convenient arrangements for charging the vehicles have been installed so that the cars may be charged in their regular places avoiding constant shifting. This is done by providing a separate charging plug for each vehicle. A main switchboard having 105 and 125 volt buses so designed to produce the best possible results in battery charging has been installed and the entire charging equipment is controlled from this board. Volt and ampere readings are recorded hourly. The boosting of batteries can be done at any rate required. The charging of batteries is under the control of a group of men who have been specially trained for this work, who do nothing else, and appreciate its importance. The switchboard is equipped to charge all types and makes of batteries.

Main Floor of West Side Garage

The superintendent has an office above the main floor, which has windows facing the floor, thus giving him a clear view at all times. A checking system for returns, a safe for the care of valuables, a time clock, a 6-ft. steel locker for each driver, wash basins, etc., are provided, making the entire equipment very up to date.

Adjoining the garage on the east and separate from the main building is located the battery depot. This depot is also operated by the Exide Battery Depots Company, of Philadelphia, who also has similar depots in the other larger cities of the country. The depot is completely equipped for repair and renewal of "Exide," "Hycap-Exide," "Thin-Exide" and "Ironclad-Exide" batteries. At this depot is handled all kinds of repair work that has in any way to do with electric vehicles. A full line of battery parts as well as other standard parts of electric cars are constantly carried in stock. The general offices are on the 2d floor, in charge of Mr. F. F. Sampson. This company also controls the East Side garage, located at 141 to 147 East Twenty-fifth Street, this garage having 14,000 sq. ft. of floor space all on the ground floor, and a capacity to care for eighty vehicles. The East Side garage is also modern in every respect, being provided with expert mechanics and a special battery man. It is provided with a drivers' room, a package room for returns and with facilities for rebuilding and overhauling electric commercial cars.

The new West Side garage as yet is not up to its full capacity, but an indication of the amount of business being done is shown by the fact that about 25,000 kilowatt-hours of current is now being used. This charging current is supplied by The United Electric Light & Power Company. of New York City.



Battery Room in Exide Garage

THE L. G. SCHOEPFLIN COMPANY'S ELECTRIC TRUCK

By GEORGE W. GRUPP

The L. G. Schoepflin Company, Buffalo, N. Y., is getting out a 1000-1500-lb. capacity electric truck, known as Model "B," which is equipped with an ampere hour meter, odometer, two 6-in. electric lights, a tail end electric light, a Rexo electric horn and an upholstered driver's seat with back.

A forty-two cell, thirteen-plate, Philadelphia Storage Battery is used, which is located amidship, suspended under the body of the car on three one-piece 1½-in. steel Ts. An Anderson Type "N" charging receptacle, volts 125, amps. 50 is attached to the car.

An enclosed single slow-speed motor with special series wind is used. This motor is located on the right side, near the rear axle underneath the body. To the motor is attached a spiral gear drive, which is a direct drive from the motor to the main gear. The drive gear is run in oil. Three teeth are always in mesh.

The controller is located on the left side of the driver's seat and has four speeds forward and three reverse.

The truck is equipped with a Lavigne steering gear, irreversible, screw and double sliding block type. The gear is provided with an 18-in. four-spoke, wooden hand wheel. It is a left-side drive.

There is one foot brake, which is provided with a ratchet and toe release. This is used as a service and emergency brake controlling two 12½-in. x 2¼-in. contracting band brakes, operating on a drum, on rear wheels which are enclosed in a dust-tight case.

The axles are made by the Leggitt Spring and Axle Company and have a 56-in. tread.

The rear axle is a 2-in. one-piece full-floating type, chrome-nickel steel with Hyatt non-adjustable spring roller bearings which are enclosed in pressed steel tubing. The rear springs are also made of Vanadium steel, full elliptic, with fourteen leaves 1¾x9-32x36 in. long.

Both front and rear axles are united by two reaches made of 1¾ in. hickory and steel castings. The frame of the truck is made of 4x1¾-in. white ash, reinforced with 2-in. angle iron.

Artillery type S. A. E. wheels made by the Wayne Wheel Company, second growth hickory with 1¼-in. spokes are used. The

The L. G. Schoepflin Company's Model A, Seven Hundred Pound Electric. Price, $1350

wheelbase is 80 in. Goodyear-Motz motor truck solid tires; front 31x3 in.; rear 37x3 in. are used.

Overall the length of the body is 120 in. with the length of the body back of the seat 78 in., and the width 42 in. The height of the platform when the truck is empty is 34 in. The body is made of the finest wood and other material obtainable.

A speed of 15 m.p.h. may be attained when loaded and 18 m.p.h. light. And the truck having a short wheelbase makes it possible to make a complete turn within a circle of 29 ft.

This model "B" is put up in three styles of bodies, namely: panel, cab and canopy. The prices are: panel body $1500, cab $1450 and canopy $1425. All prices are f.o.b. Other batteries are optional. Prices will vary accordingly.

This company is also getting out a 550-700-lb. capacity truck known as Model "A" which sells for $1350 f.o.b.

Chassis is of such construction that it can be adjusted to fit any length of body that customer desires. Car and body are made to suit customer's business.

The Couple-Gear One-Wheel Drive Electric Tractor

IN LINE with the growing tendency of truck manufacturers to produce special types of vehicles to perform a particular service for which the ordinary types are unsuitable, the Couple Gear Freight Wheel Company, Grand Rapids, Mich., has brought out a one-wheel drive electric tractor for use in lumber yards and places of similar nature where the most economical way of handling the goods entails the use of a number of unpowered units which may be left at the proper points for loading and later picked up by a power unit which in this way is able to handle a great number of trailers.

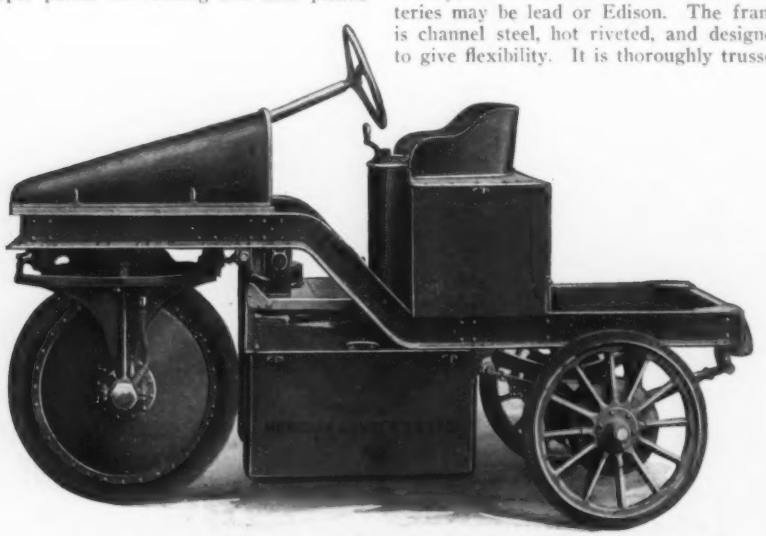
This trailer has been adopted by different large companies which have used it with as many as five or six trailers at one time. When hitched properly the train can be successfully drawn around turns, even as great as a right angle. Two- or four-wheeled trailers may be used for the work. Where four-wheeled trailers are used, but one man is necessary to properly handle the train. Where two-wheeled trailers are used, two men are required for prompt operation.

The tractor is built in two sizes, H-S having draw bar pull capacity ranging up to 1000 lbs. and A-S having draw bar pull capacity ranging up to 1500 lbs. The smaller handles from 2000 to 5000 ft. per trip, the larger from 2000 to 7000 ft., depending upon tram condition. Speeds vary from 4 to 10 m.p.h., according to loads and grades, with a maximum of 15 miles light if specified.

This machine is powered by a direct current, four pole, series wound motor within the front wheel. This motor has a 3-h.p. railway motor rating. It is fitted with plastic bronze and roller bearings, has a momentary overload capacity of 200 per cent., and is readily accessible without removing the wheel from the tractor.

The motor is supplied from a storage battery, carried under the seat. These batteries may be lead or Edison. The frame is channel steel, hot riveted, and designed to give flexibility. It is thoroughly trussed with forgings. The springs are semi-elliptic and helical, arranged to provide easy passage over rough trams.

The front power wheel has a 36-in. rubber tire, while the artillery rear wheels have 30-in. rubber tires. The rear wheels have contracting type, asbestos lined brakes, 14x2 in., on each rear wheel. The controller is street car type, with five speeds forward and reverse.



Couple-Gear One-Wheel Drive Tractor, With Jaw Coupler
Batteries carried under body; drive by single front wheel. Especially useful in lumber yards and places of similar nature

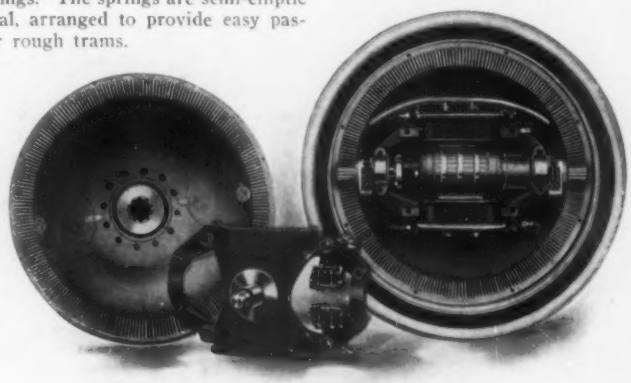
THE BUFFALO ONE-TON ELECTRIC TRUCK

The Buffalo Electric Vehicle Company, of Buffalo, N. Y., which has been making electric pleasure cars for a number of years, is getting out a one-ton capacity electric truck for city and suburban delivery.

A standard General Electric motor of 85 volts, 22 amperes and 1000 r.p.m., with a generous overload capacity, mounted on a three-point suspension, is used. The motor, located amidship on the chassis, is connected direct with the double-reduction gears in the rear axle, and the motor automatically develops the power necessary to meet any road or grade condition which it is apt to encounter.

The controller, which is located on the left of the driver's seat, as the truck is a left drive, is of the continuous torque type with five speeds forward and two reverse. To the controller a safety switch is attached, which is a spring plunger, Yale lock and absolutely thief proof.

A feature is the patented foot control, which enables the driver to control his car, slow down and stop (as is often necessary in congested traffic), by simply pressing a pedal, automatically cutting off the power and applying the brakes. Removing pressure from pedal releases brakes and applies the power. Meantime, both hands are free to operate steering wheel and warning signal. This device conserves current, gives



Interior of Front Wheel, Showing Motor Drive

Buffalo Electric With Stake Body
Chassis, with electric bell, electric dash and tail lamps, jack and tools, sells at $2000, with battery extra

greater mileage, saves wear on working parts and makes the operation safe and simple.

Each buyer is permitted to choose between eight types of batteries for his truck.

The front axle, which is 2 in. wide and 2½ in. deep, is forged from a single piece of I-beam section.

The rear axle is the double-reduction, full-floating type made from a continuous piece of pressed steel. The rear axle bevel gears are made of a tough, special analyzed steel, drop forged, machined, hardened, heat treated and ground. The bevel gear ratio is 9 to 1.

Two sets of brakes are used, an internal expanding and an external contracting (one on each rear wheel), with a total braking surface or 500 sq. in.

The steering gear is the Gemmer type, with an 18-in. spider wooden wheel.

Carefully selected and analyzed pressed steel, 4½ in. deep, 1⅜ in. wide, ⅜ in. thick, channels are used in the frame construction.

Four semi-elliptic springs have been designed to carry its load capacity satisfactorily and also to assure easy riding when light. The front springs being 40 in. long, 2 in. wide, ¼ in. thick, built up with eleven leaves located under the frame. The rear springs are 47 in. long, 2¼ in. wide, 5/16 in. thick, built up with eleven leaves which are side slung.

Wooden wheels of artillery type are used. The front wheels have twelve spokes, 2 in. wide, with pressed steel wheel flanges. The rear wheels also have twelve spokes and are 2 in. wide. Electric special compound solid tires, front, 36x3½; rear 36x5, are used. The wheelbase is 102 in. with a 58-in. tread.

The chassis, equipped with an electric bell, electric dash and tail end lights, jack and tool kit, sells for $2000 without the battery and with a battery from $2400 to $3320, f.o.b., this price depending upon the type of battery chosen. This company is also getting out a 1500-lb. capacity chassis for $1800 without the battery and with the battery from $2150 to $2745, f.o.b.

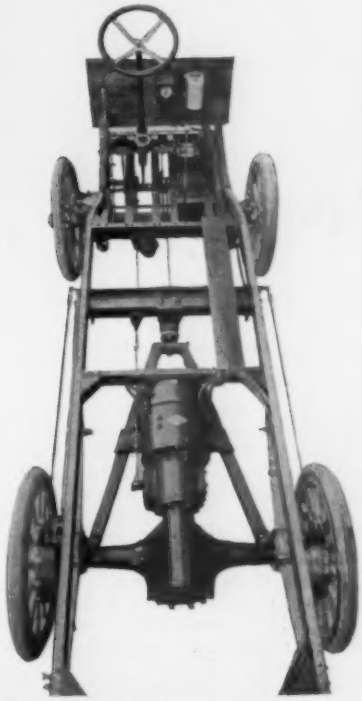
SPECIAL ELECTRICS BUILT BY BAKERY

Some time ago the Saint Paul Bread Company, St. Paul, Minn., built a number of electric trucks for its delivery service, these being in 1200 and 2000-lb. capacities, built for a 20 per cent. overload.

The feature of these trucks is the use of a combination of motor, two-speed gear shift and the worm drive rear axle, the first two members being mounted on a three-point suspension formed by two I-beams attached to lugs on each side of the rear axle and to a ball joint attached to a cross member of the frame. The three members are rigidly bolted together.

These trucks could not be used in the territory this company covers, were it not for the gear shift.

Wheelbase of both machines is 102 in.; wheels, 36-in. artillery wood; tires, 36x3 and 3½ on the 1200-lb. and 36x3½ and 4 on the 2000-lb.; the ratios are 12 and 13¼:1 with 24 and 26½:1 when working through the gear shift on the small machine and 13½ and 15:1 and 26½ and 30:1 on the large machine; motor runs 1500 r.p.m., being fed through a Westinghouse four-speed and reverse controller.



St. Paul Bread Company Chassis
Note the unit of motor, two-speed gear shift and worm-drive rear axle

Panel Type Body Used by St. Paul Bakery
Batteries are under seat

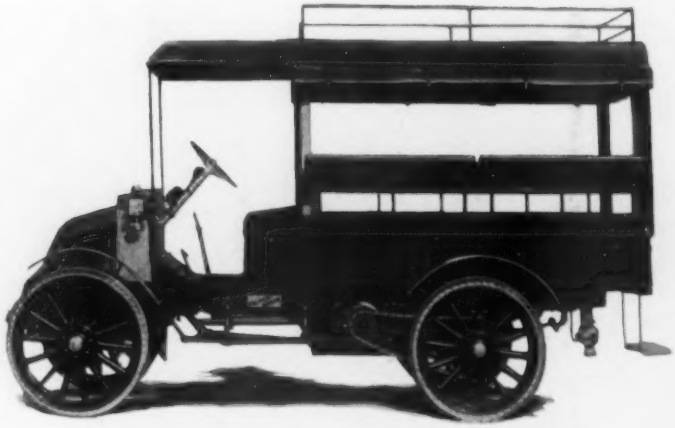
BUYERS IN EVIDENCE IN SOUTHERN CALIFORNIA

Without an exception the dealers at present at the Los Angeles Truck Show are able to give a list of recent sales and prospects of the right sort, which justifies an optimistic outlook on the motor truck situation in this section for the next few months. An interesting feature of this show, not only the extended variety of types exhibited, but the photographs and publicity material, prepared by the manufacturer showing how successfully trucks are being operated by firms and individuals in every line of business, and under the widest possible range of conditions.

The Jeffery people are using motion pictures showing Government tests of the Jeffery quad at Fort Sheridan and elsewhere, and slides of the quad at work in local Government hauling, and other service.

The Moreland exhibit is brightened up by some remarkable photographs taken on some of the tours on which the Moreland factory representatives had taken stock trucks through the worst mountain passes and back country roads in the deserts and mountains.

The following is a complete list of the exhibitors of trucks. Pierce-Arrow, Wm. Bush; Peerless, Smith Brothers; G. V. Electric, Commercial Electric Garage, Harry W. Harrison, Proprietor; Packard, California Motor Company; Moreland, Moreland Motor Car Company; Moore, Pacific Metal Products Company; Kissel-Kar, Pacific KisselKar Branch; Beardsley, Electric Truck, Bearsdley Electric Company; White, Pioneer Commercial Auto Company; Autocar, M. S. Bulkley and Company; Republic, L. R. Carpenter Company; Western Imperial Electric, Western Imperial Electric Company; Wichita, Pacific Coast Wichita Tr. Company; Atterbury, H. G. Pendell. G. M. C., Pioneer Commercial Auto; Homer Tractor, Homer Motors Company; Lincoln, E. H. Whiteside; Mission, Mission Motor Car Company; Federal, Pacific KisselKar Branch. And about twenty accessory firms.



Palmer-Moore 'Bus Makes Profitable Showing

John E. Horton, of Syracuse, who operates a 'bus line between the interurban trolley and the resorts on Otisco Lake, purchased a Palmer-Moore fourteen-passenger motor 'bus, and states that the record of the last four months has exceeded all expectations, both as to profitableness of the venture and the low up-keep cost of the car. The round trip from trolley to lake is about fifteen miles. Six trips, or about ninety miles per day, is the average the truck is run; never less than four trips, and occasionally ten, have been accomplished. Mr. Horton claims to have obtained practically ten thousand miles out of his first set of tires.

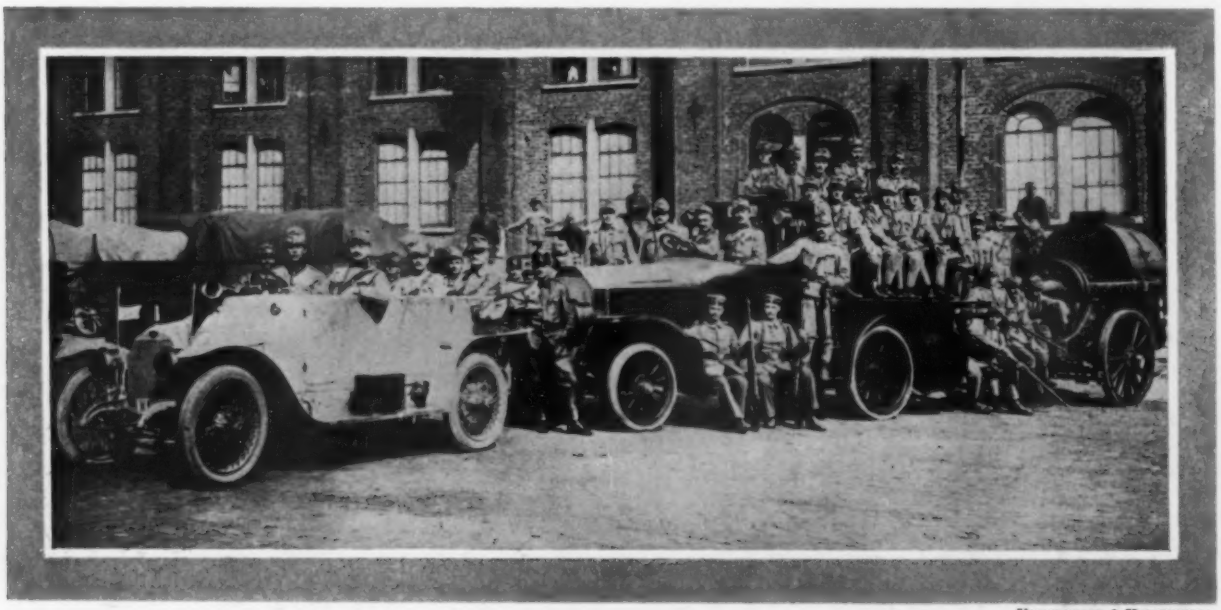
PARCEL-POST TRUCKS TO AID IN LOWERING COST OF LIVING

With a recent installation of five new 1000-lb. trucks and prospects of three more in the near future, the Cleveland postmaster is ready to handle any volume of parcel post matter.

To increase the business of the trucks and to afford greater convenience to Clevelanders and producers of the surrounding territory, a plan is used by which all farmers who have butter, eggs and general produce for sale, are requested to forward their names to his office.

These names of producers will be printed free by the government, and the list will be displayed in federal building and substations in the city, and in addition will be distributed direct to Clevelanders by carriers. The plan will be for consumers to write to farmers regarding prices. Orders will be mailed and goods received in a day or two. Uncle Sam will collect when he delivers the package.

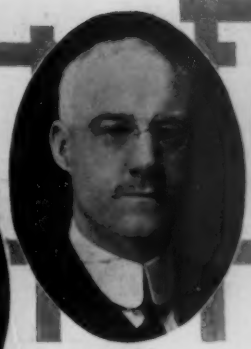
By this means the postmaster hopes the parcel post will beat down the cost of living.



UNDERWOOD & UNDERWOOD

German and Austrian Soldiers in the Eastern Sphere of the War, Starting Out With an Immense Searchlight For Use in Night Scouting and Attacks

August Becker
Pres. and Treas.



J. C. Miller
Secretary

E. J. Barcalo
Vice-Pres.

Wm. Haskin
Superintendent

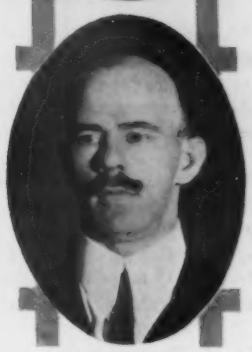
Our Dealers' Sign

C. S. Dahlquist
Chief Engineer

Lippard-Stewart MOTOR TRUCKS

½ TON—¾ TON—1 TON—1½ TON—2 TON

Hugh H. Goodhart
Advertising Manager



G. O. Ingram
Office Manager

TRUE worth and dependability of an industry are measured by the business experience, integrity and success of men. A new industry builds a new type of business man. Before the industry finds its level, however, many men go against the rocks because they have been working without business experience.

The pleasure car industry may demand an expert manufacturer, an expert advertising man and expert salesmen, but the successful manufacturer of commercial cars demands even more. It requires executive heads of the broadest business knowledge, engineers, sales people, who through experience and training appreciate and can take up intelligently, the problems connected with motor truck use.

The experience of the men connected with the Lippard-Stewart Motor Car Co. enables them to place themselves in the position of the buyer or user of a commercial vehicle. Conservative men in the organization have always been a safeguard against impractical methods and policies. As merchandising men they work with extensive experience. The engineers distinguish between the requirements of touring cars and weight-moving vehicles. The result is a line of Lippard-Stewart Trucks that solve the majority of transportation and delivery problems.

It is the working ability of this organization plus the working ability of Lippard-Stewart cars that gives Lippard-Stewart owners and dealers their great confidence.

With an increasing business, with the occupation of a new plant, with a well-established organization, the Lippard-Stewart Motor Car Co. stands in a position of particular advantage in the motor truck industry today.

C. R. Jones
Southwest

J. E. Douglass
South

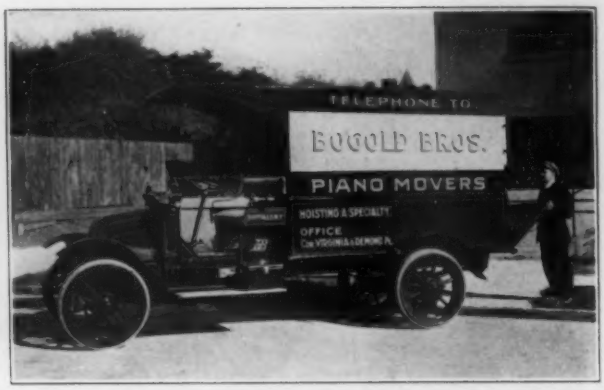
J. S. Innes
Canada & N. Atlantic

S. M. Harmon
New England

Samuel C. Harvey
Middle West

A. M. Russell
Northwest

¾ Ton Car—Browning, King & Co., New York City



1 Ton Truck—Bogold Bros., Buffalo

EXPERIENCE OF USERS

The Hoefler Ice Cream Co., of Buffalo, operate a fleet of 1500 lb. Lippard-Stewarts. Their busy season is from April to October, and they average close to 100 miles per truck per day. The rest of the year they average 50 miles a day. In summer their cars average 15 miles to a gallon of gasoline. In winter's snow and ice, their average is nine to ten miles per gallon.

Hale Bros., of San Francisco, use nine Lippard-Stewarts, not one of which has ever been laid up, and the oldest car has run almost 25,000 miles. The average travel of each car is 46 miles daily. Gasoline is used at the rate of 9¾ miles per gallon. Tires average 4500 miles per case; ranging anywhere from 3,000 miles to 10,000. From 100 to 225 packages are delivered daily, or an average of about 150 packages per car.

M. M. Newcomer Co., Knoxville, Tenn., with their Lippard-Stewart reach their trade ***every day,*** where with horse-drawn vehicles, they could reach their trade only every other day. This delivery car averages 45 miles each day, making 150 stops over a hilly section and country roads. The tire service is 6,000 miles per set. Gasoline consumption, ten miles per gallon.

James Wass & Son, Buffalo Milk Dealers, have proved that the Lippard-Stewart gives satisfaction even under the most unfavorable conditions. Each day their 1500 lb. model makes 250 stops, delivering to 305 customers in 5½ hours time; motor running ten miles on a gallon of gasoline. This firm replaced three one-horse wagons and is able to dispense with the services of one man since the installation of this car. The time consumed in covering their route was reduced three hours.

Larkin Co., of Buffalo, have adopted Lippard-Stewart 2 ton trucks exclusively for medium and light hauling. Their second repeat order was for five trucks. They have used rebuilt cars and other makes of commercial vehicles. For years they have been making a general comparison of the leading trucks on the market under the most severe conditions. Their choice of Lippard-Stewarts is based on results obtained.

LIPPARD-STEWART prestige is not the policy of the company, but trade. Read the following list of and of reputation for keen business

M. Albert's Sons, Baltimore (2)
F. H. Johnson, 114 Faneuil Hall, Boston (2)
United Shoe Machinery Co.
Sumner Garage & Sales Co., Brooklyn (7)
J. Wotiz & Son, Brooklyn (2)
Buffalo Express, Buffalo (4)
Barcalo Mfg. Co., Buffalo (3)
Courier & Enquirer, Buffalo (9)
Dominion Natural Gas Co., Buffalo (2)
Hoefler Ice Cream Co., Buffalo (6)
Larkin Co., Buffalo (8)
Louis K. Liggett Co., Buffalo
Niederpruem Bldg. Co., Buffalo
William F. Tappe, Buffalo (2)
Charlotte Pepsi Cola Bott. Co., Charlotte, N.C. (2)
Wells Bros. Co., Contractors, Chicago
Joslin Schmidt Co., Chemists, Cincinnati
Hammermill Paper Co., Erie
Greenwood Coca Cola Co., Greenwood, S.C.
Cohen Bros., Jacksonville, Fla. (2)
Ice Delivery Co., Jacksonville, Fla.
M. M. Newcomer, Dept. Store, Knoxville, Tenn.
Bradley & Smith, New Haven
Best & Co., New York City (3)
Revillon Freres, Furriers, New York City
Rogers Peet Co., Clothiers, New York City (3)
Shults Bread Co., New York City (10)
Stern Bros. Dept. Stores, New York City
Louis K. Liggett Co., New York City
Fischer's Bakery, Oakland, Cal. (2)

You see fleets of Lippard-Stewarts giving in the majority of cities. They make cities. They establish records on the and Seattle. Over forty concerns own having been placed after the first car or tion with other makes of trucks.

A Fleet Operating Over the Hilly Streets of Seattle, Wash.

Body Prices
(For ¾ Ton Model)

Standard panel and stake body, **$150**

Standard box and express body, **$125**

Body prices for other Models on request

General

CONTINENTAL MOTOR — 35 H.P. (2 and 1¼ Ton), 30 H.P. (1 Ton and ¾ Ton). Selected for great durability and "get there" power. The long stroke motor for trucks.

AUTOMATIC SPEED GOVERNOR—An absolute protection against foolish waste of power and ignorant driving.

EISEMANN MAGNETO—Gives very hot spark on low or starting speeds as well as on high speeds.

CONE CLUTCH—For simplicity and great dependability.

BROWN-LIPE TRANSMISSION

1½ Ton Truck—W. Fred Richardson, Inc.

2 Ton Truck Adopted by Larkin Co.

only determined by the men directing also by users in almost 100 lines of owners of well-known business standing judgment:

Oakland Cream Depot, Oakland, Cal. (2)
Boggs & Buhl, Pittsburgh (4)
City of Pittsburgh (2)
Dauler, Close & Johns, Furniture, Pittsburgh
Frank & Seder, Pittsburgh (2)
Philadelphia Co., Pittsburgh (6)
John Taylor, Pittsburgh (3)
Meier & Frank Co., Portland, Ore.
Olds, Wortman & King, Portland, Ore.
W. Fred Richardson, Inc., Richmond, Va. (3)
Sibley Lindsay & Curr Co., Rochester, N. Y.
Land Hotel, Sacramento, Cal. (2)
Hale Bros., San Francisco (9)
George Johnson, San Francisco (4)
Pacific Hdwe. & Steel Co., San Francisco (3)
White House, San Francisco (2)
Savannah Brewing Co., Savannah, Ga.
Crescent Bottling Works, Sedro Woolley, Wash.
Bon Marche, Seattle, Wash. (5)
Carstens Packing Co., Seattle, Wash.
De Lape Tours Co., Sight Seeing, Seattle, Wash.
Terminal Transfer Co., Seattle, Wash.
T. S. Martin, Sioux City, Iowa (2)
Bondi Bros., Com. Merchants, Springfield, Mass.
Vander Bie Ice Cream Co., St. Paul, Minn. (2)
Clem Bros., Coal Dealers, Staunton, Va.
Kolb Baking Co., Trenton, N.J.
H. S. Barney Co., Troy
Troy Gas Co., Public Utilities, Troy, N.Y.
Gordon Drysdale, Ltd., Vancouver
A. Loffler Sausage & Provision Co., Washington (3)

silent, speedy and "good-looking" service extensive suburban runs out of eastern hilly streets of San Francisco, Pittsburgh two or more Lippard-Stewarts, reorders cars had proven their value in competi-

MORE SATISFIED OPERATORS

W. Fred Richardson, Inc., of Richmond, Va., says of their 1½ ton truck, "We are making 500 miles on every 50 gallons of gasoline and carrying on an average of 2600 lbs. Sometimes the truck is run hub deep in mud, but it pulls out without effort. With our knowledge of the Lippard-Stewart we will be willing to sell the two trucks of other make we have if we could get what they are worth and put in two more Lippard-Stewarts."

A second order for a 2 ton, and a third for a 1500 lb. type for funeral service, is the endorsement given Lippard-Stewarts by this firm.

The Shults Bread Co., of New York, have in eight months purchased ten Lippard-Stewarts of 1½ tons capacity and invested almost $25,000.00, making the first purchase of two in February, two in May, two in June, and four in September, 1914. Several of this fleet have traveled 17,000 miles; not one has been laid up five minutes time. Each truck averages between 100 and 125 miles daily, uses gasoline at the rate of nine to ten miles per gallon, and oil at 400 miles per gallon.

Dauler, Close & Johns, of Pittsburgh, operate a 1½ ton truck. They write: "During the last three or four months the streets of Pittsburgh have been in poor condition on account of snow and ice, but we have had no trouble with our truck. We believe that there is no better truck on the market for its size, at the price, than the Lippard-Stewart."

The United States War Department purchased three 1½ ton Lippard-Stewarts for escort work on the Mexican Border. This purchase was independent of the European influences, such as are making business for nearly every truck maker in this country now, but was the result of careful investigation on the part of Government Experts. It was the features and the general construction of the Lippard-Stewarts that secured the order.

The Oakland Cream Depot, Oakland, Cal., states that the use of one Lippard-Stewart delivery car effects a saving of $125.00 a month over horse-drawn vehicles, which were replaced.

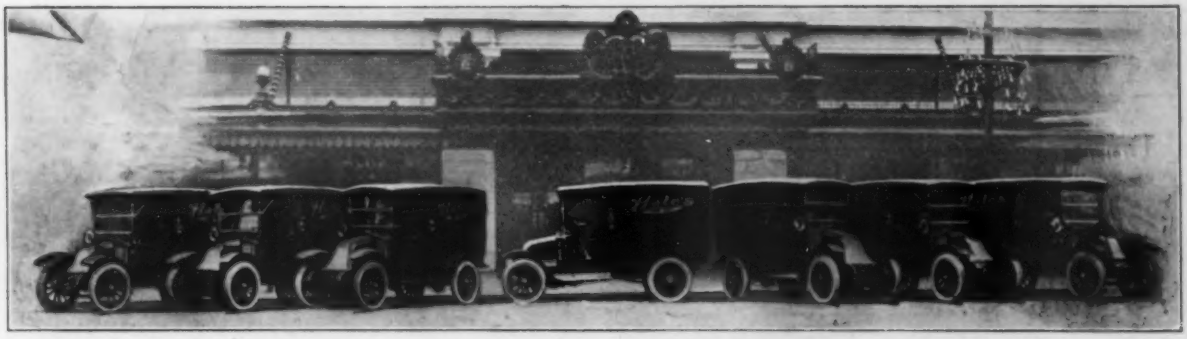
Repeat Orders Continue to Come From This New York Operator

Specifications

TIMKEN AXLES AND BEARINGS—Both of recognized QUALITY and standard excellence.
WORM DRIVE (DAVID BROWN)—(Standard on 1 Ton, 1½ Ton, 2 Ton; on ¾ Ton extra above bevel drive.) Gives steady, even drive with minimum loss of power. More dependable and durable than chain or bevel-spur gears. The kind that gained fame on the London omnibuses after other drives had failed.
WHEEL BASES that suit the load.
BIG SIZE TIRE equipment.
LEFT STEERING — CENTER CONTROL.

Chassis Prices

¾ Ton bevel drive, **$1650**
Worm drive, **$125** net extra
1 Ton . . **$2000**
1½ Ton . **$2300**
2 Ton . . **$2600**

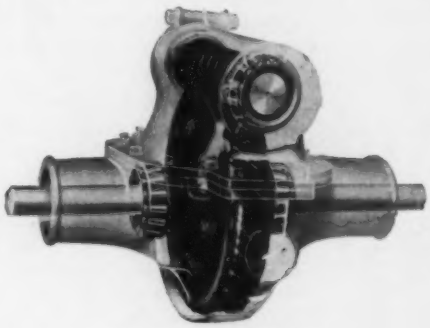


Hale Bros., San Francisco. See Inside Pages for Results Obtained

What Worm Drive Means

A GOOD indication that the Lippard-Stewart Organization understands motor truck requirements is that all their cars are furnished with worm drive. It was the influence of the men behind the Lippard-Stewart Organization, with their practical view as much as the experience of engineers, from the technical standpoint, that determined this practice.

Greater efficiency of worm drive, longer life, greater power, saving of fuel, saving of wear and tear on mechanism, its silence and freedom from complication, give truck users more continuous service, less upkeep expense, than can be obtained by any other type of drive.



David Brown Worm Drive

Will Appear on the ½ Ton Car

SO convinced are we that business men appreciate the value of design and construction and importance of the worm drive in Lippard-Stewart Trucks that we will soon bring out the **½ ton delivery with worm drive.** This new Lippard-Stewart is the foremost step to furnish proper motor delivery to thousands of merchants who have been wasting money on the makeshift, reconstructed pleasure cars never intended for carrying commercial loads.

We Offer a Complete Line of Trucks and Delivery Cars for Dealers

USE a Lippard-Stewart in the size that your special work calls for. Big loads and light loads should be carried with equal efficiency; the waste of overloading or underloading can be eliminated. Standardize your hauling system, prevent the confusion and greater expense of maintaining many different makes of trucks. A fleet of Lippard-Stewarts is a businesslike solution of a transportation or delivery problem.

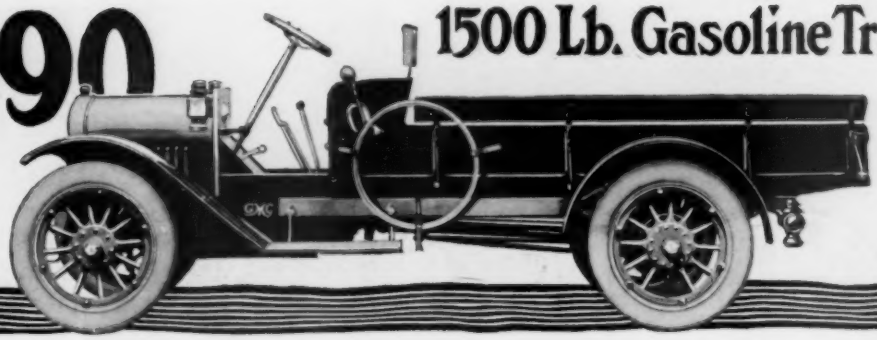
Lippard-Stewart dealership or agency is a rare opportunity to supply the majority of truck requirements through a single make of trucks. Take up the subject with us at once. Our engineering department is at your service. The experience of business men is yours for consultation. Request for Catalog must be on a business letterhead.

LIPPARD-STEWART MOTOR CAR CO.,

NEW FACTORY: 237 W. UTICA ST.
BUFFALO, N. Y.

A Fleet Purchased by The U. S. Army for Transport Work on the Mexican Border

$1090 (Chassis Only) 1500 Lb. Gasoline Truck



A New Light Truck at a New Price

Here is a rugged practical light truck built by the makers of the only complete line of gasoline and electric trucks. It is economically manufactured in the largest exclusive truck factory in the world.

More than three years ago we began experimental work on a light truck. We built several models. We put them to work in different parts of the country and in different lines of business.

We made a study of all light trucks offered by other makers. We carefully compared the relative advantage of various features of design.

Our new 1500 lb. light truck is the result of these years of investigation. After testing this latest model for two years, we believe we have produced the **all 'round practical truck** needed by to-day's business.

Big Production Makes Price Low

In our preliminary announcement of this truck it was priced at $1150. It was so well received by our dealers and customers, however, that we have increased our production schedule and lowered the price to $1090 — a price made possible only by big production and big buying power.

At $1090 this light truck can be operated with profit in many classes of work that formerly could not be economically handled by heavier trucks alone. It can also be used in many lines that have not yet felt able to afford the advantages of motor delivery. It is a practical truck for the farmer, retail merchant, jobber, wholesaler, truck gardener—anyone who has loads to haul not exceeding 1500 pounds.

Specifications in Brief

Capacity—1500 lbs. in addition to body weight allowance of 750 lbs.
Weight—Complete chassis 2360 lbs.
Speed—20 miles per hour.
Motor—Vertical, 4-cylinder, water cooled—"L" type, 3½" bore, 5" stroke.
Carburetor—Automatic float feed type.
Governor—Automatic, fully enclosed and Yale locked.
Control—Left hand drive, center control.
Transmission—Sliding gear, selective type—3 speeds forward and reverse. Direct drive on high.
Drive—Propeller shaft.
Brakes—Two sets.
Tires—35"x5" all around—pneumatic.
Wheel Base—122".
Tread—Front and rear 56".
Price—Chassis only in lead, including seat, two oil side lights, one oil tail light, horn, complete set of tools, including jack and extra demountable rim, $1090 f. o. b. Pontiac, Michigan.

Remember

We make the most complete line of gasoline and electric trucks yet produced; seven gasoline models up to 5 tons capacity and eight electric models up to 6 tons. In this line there is the *right* truck for *your* business no matter what its requirements.

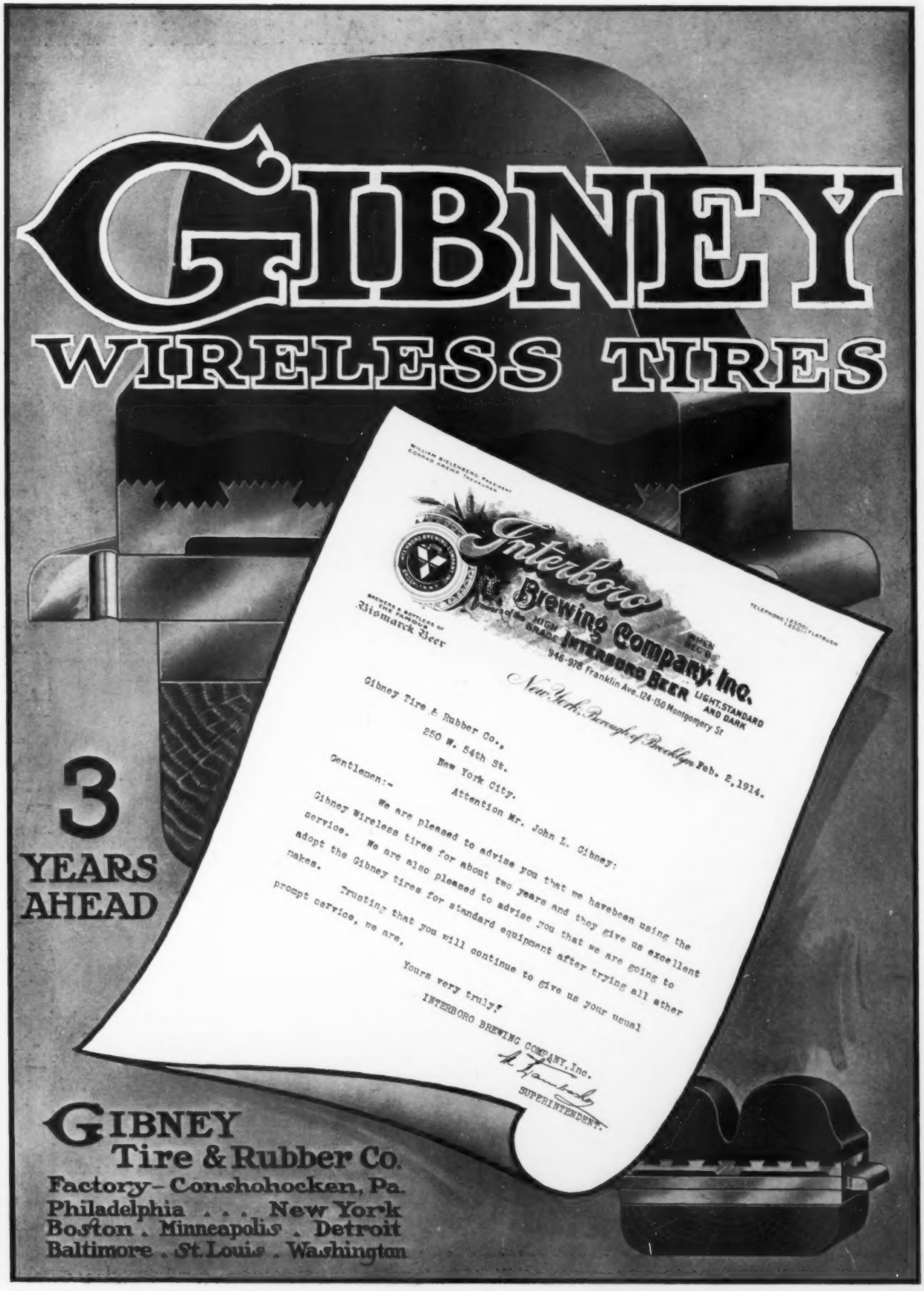
Explain your haulage conditions to us and we will tell you frankly what kind of truck, if any, will serve you with profit. Communicate with the nearest GMC dealer or write our factory direct as you prefer.

DEALERS—We start deliveries of 1500 lb. gasoline models November 15th. Write for our special proposition in unoccupied territory.

GENERAL MOTORS TRUCK COMPANY
One of the Units of General Motors Co.
Pontiac, Michigan

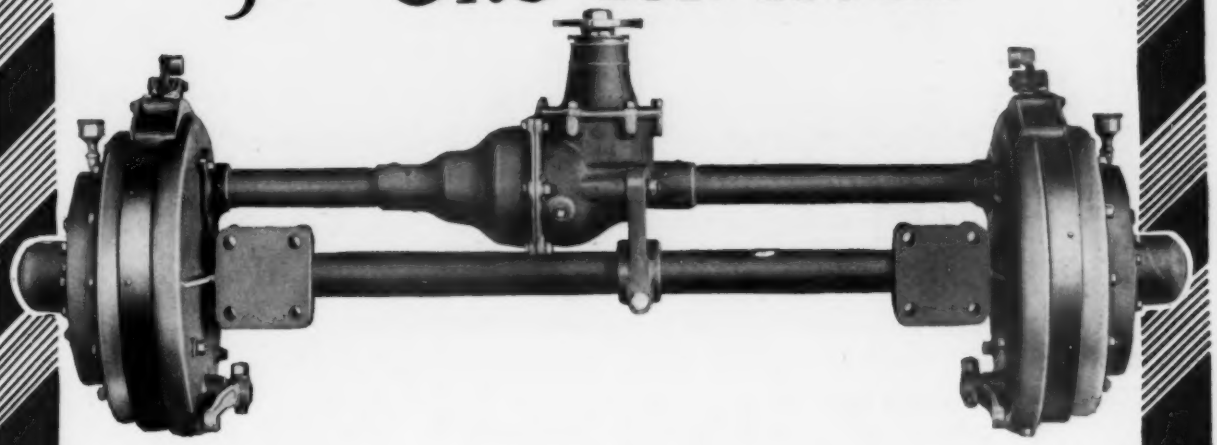
Direct Factory Branches:
New York, Boston, Philadelphia, Detroit, Chicago, St. Louis, Kansas City

Gasoline — GMC — GENERAL MOTORS COMPANY TRUCKS — *Electric*


GIBNEY
WIRELESS TIRES
3
YEARS
AHEAD
Interboro
Brewing Company, Inc.
946-978 Franklin Ave.-124-150 Montgomery St
Brewers & Bottlers of
Bismarck Beer
LIGHT-STANDARD AND DARK
New York, Borough of Brooklyn, Feb. 2, 1914.
Gibney Tire & Rubber Co.,
250 W. 54th St.
New York City.
Attention Mr. John L. Gibney:
Gentlemen:-
We are pleased to advise you that we have been using the Gibney Wireless tires for about two years and they give us excellent service. We are also pleased to advise you that we are going to adopt the Gibney tires for standard equipment after trying all other makes.
Trusting that you will continue to give us your usual prompt service, we are,
Yours very truly,
INTERBORO BREWING COMPANY, Inc.
SUPERINTENDENT.
GIBNEY
Tire & Rubber Co.
Factory—Conshohocken, Pa.
Philadelphia . . . New York
Boston . Minneapolis . Detroit
Baltimore . St. Louis . Washington

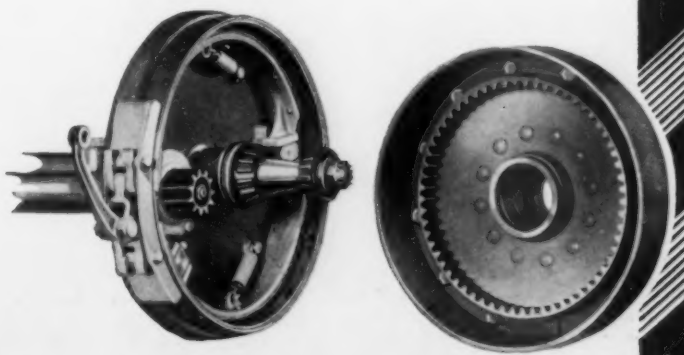
Russel

Internal Gear Drive Axle for One Ton Truck



FOR over a year our Engineering Department has concentrated its entire attention on the development of the one ton truck axle. Our investigations and tests have shown us the strength and weakness of the various rear drive systems now in use. The logical result has been the development of the one ton axle announced herein. We believe it represents the most serviceable compromise between the conflicting demands of durability, efficiency, quietness, simplicity, neatness and cost.

RUSSEL MOTOR AXLE COMPANY
North Detroit
• Michigan •



When Writing, Please Say—"Saw Your Ad. in the C C J"

SHELDON

WORM GEAR AXLES

The preference of Sheldon engineers for the semi-floating type of axle construction is based upon the ability of this type of axle to meet and withstand actual service conditions not only more consistently but with infinitely greater success than any other type of axle, whether considered in connection with pleasure car or truck practice.

A full-floating axle is an axle wherein the differential is supported wholly by housing; wheel supported on two bearings wholly by housing; driving axles take only torsional loads.

A semi-floating axle is an axle wherein the differential is supported wholly by housing; wheel supported by driving axle supported by bearing seated in housing, taking both torsional and wheel loads.

Accessibility is about the only virtue possessed by the full-floating type of axle which is not possessed by the semi-floating type in an equal degree.

Sheldon engineers prefer to honor the demand for accessibility by doing everything within their power to obviate the need for it.

Accessibility to facilitate the accomplishment of repairs would be a virtue if it were not a downright confession of weakness.

Semi-floating axle construction is the confidence of strength.

Accessibility for lubrication is, of course, a cardinal virtue, but in this respect there is no choice between the two types of axles.

Simplicity is the mark of master design, lightness the mark of master construction. The simple strength of the semi-floating type of axle construction is the answer Sheldon engineers give if they have been guilty of sacrificing accessibility in preferring semi-floating axle construction to full-floating axle construction, and this is a logical reason, for it amounts to what counts for service. It is the thing which makes a Sheldon axle one of the last things on either pleasure cars or trucks to give trouble.

Sheldon front axles, Sheldon springs, Sheldon brake and radius rod equipments are all produced according to the same high plane of engineering which has developed Sheldon Worm Gear Rear Axles.

In each unit of our production, efficiency and service are the dominating characteristics sought. Each of these units shows a most intimate knowledge of truck engineering and truck service conditions.

THE SHELDON AXLE & SPRING COMPANY

WILKES-BARRE — **PENNSYLVANIA**

Makers of Springs and Axles for Heavy Duty Service for More Than 50 Years

Chicago: 122 S. Michigan Blvd. — **Detroit: 1215 Woodward Ave.** — **San Francisco: 444 Market St.**

FEDERAL TRUCK in front of THOMPSON AUTO COMPANY, Detroit
FEDERAL Distributors for Michigan

THE OPPORTUNITY

The agency for Federal Motor Trucks gives you the opportunity to build up a very profitable truck business in your territory. It is a very desirable connection, because Federal Trucks give the service your customers demand—they stay sold and bring in repeat orders.

Some of the largest concerns in the country are operating fleets of Federals—buying one after another as their business demands increased transportation facilities.

From a financial as well as a production standpoint the Federal Motor Truck Company occupies a very strong position in the truck industry—they are in business to stay.

Federal Trucks are proving all over the world their efficient and dependable service-giving qualities in nearly every line of trade.

The Federal transportation engineering department has some very illuminating facts gained from the results of Federalized transportation in different business that will help you solve your customers' haulage problems. Go over the situation in your territory and let us hear from you.

Federal one and one-half ton Motor Trucks are made in two lengths of wheel base in both worm and chain drive models.

FEDERAL MOTOR TRUCK COMPANY

158 LEAVITT STREET **DETROIT, MICHIGAN**

Veeder
HUB ODOMETER

The necessity of knowing how much ground each truck covers is unquestioned and the value and accuracy of the **Veeder** for that purpose is universally admitted. No good business man would now think of running his trucks on guesswork. He wants a mileage recorder of some kind to keep his records straight. Unfortunately, however, many seem to think any instrument will do. This is not the case, for many makes, accurate enough under normal conditions, fail when they are most needed.

The **Veeder** is not only a recorder of miles traveled — it is also a crook-proof instrument. That is to say, it cannot be made to record falsely, either too much or too little. It cannot be disconnected without breaking the seal or put out of commission. It records forward, whether the truck runs forward or backward. In short, no dishonest, lazy or incompetent driver can cover up his record while the **Veeder** is on the job.

You may not have such a driver or may not know you have, but you need the **Veeder,** for it is a protection against temptation for the honest and an exposer of the dishonest. It will help you to eliminate excessive operating expense and to place all of your trucks on a profitable basis. That's a good enough reason to induce any man to install a **Veeder** on each of his trucks.

Ask us about Form K — Price, $20.

The Veeder Manufacturing Company
10 SARGEANT ST., HARTFORD, CONN.

Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Small Die Castings

T. H. CRANSTON & CO.
56 E. Randolph St., Chicago

BERNARD I. BILL
543 Golden Gate Ave., San Francisco, Cal.

WHY
EXPERIMENT
WITH
EXPERIMENTERS?

Cleveland
Worm Gears

ARE BEST
BY TEST

Cleveland
Worm & Gear Co.
Cleveland, Ohio

Everywhere Buda pulls them —beautifully!

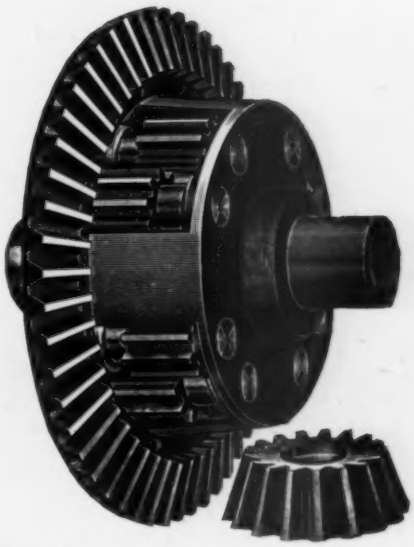
Pulls pleasure cars, little and big. Pulls trucks, little and big. Pulls them — well, strongly, silently, willingly, economically, fast, slowly; with four cylinders and with six; mile after mile, day after day, year after year. For it is built as well as human skill permits, the motor first, the price afterward. Yet the price is not high. Write us today.

BUDA MOTOR
"The part that sells the car"

CULLMAN SPROCKETS and Differentials

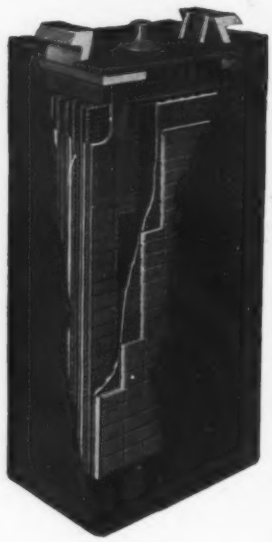
in stock and to order.

Send for catalog and let us quote you on your requirements.



CULLMAN WHEEL COMPANY, CHICAGO
1351 GREENWOOD TERRACE

Be Sure About the Service Before You Buy Any Storage Battery



You can't tell by appearance, for the finest terminals, connectors, jars, etc., cannot compensate for deficiencies in the **plates,** which really **are** the battery.

Plate faults show up only after a battery has seen service, so the battery maker's known ability and business integrity must be your protection.

Gould Storage Battery

The Gould Battery has proven best as a logical result of our long-life, high-capacity, hard-paste plate construction. In every field we have entered, this battery has made enviable records, and for 14 years the name Gould has stood consistently for fair, honorable treatment of customers.

If you place your order without inviting our beneficial competition, you deny yourself the great advantages of economical buying, the backing of the strongest organization in the storage battery field, and the use of widely distributed service facilities.

Ask about our capacities and durability for electric vehicles.

Gould renewal plates fit jars of any make.

Gould Storage Battery Co.

General Offices: 30 East 42nd Street, New York City

Boston, 14-16 Cambria Street
Philadelphia, 613 Betz Bldg.
Cleveland, 1761-5 East 18th Street
Detroit, 88 East Congress Street
Chicago, 225 E. 22nd St.
San Francisco, 1448 Van Ness Ave.
Los Angeles, 110 East Pico Street

WORKS: Depew, New York

Agents in WASHINGTON, ROCHESTER, BUFFALO, PITTSBURGH, MILWAUKEE, MINNEAPOLIS, ST. LOUIS, KANSAS CITY, OMAHA, DENVER, TOPEKA, SEATTLE

Canadian Representative: R. E. T. PRINGLE
Toronto Montreal Winnipeg Vancouver

Full stock carried in all cities where we have offices or agents

114

There's no leak proof ring but the LEAK-PROOF Ring — insist

POWER
Depends on Piston Rings

Full power—no half measure—*all* the power contained in every ounce of gasoline in your tank. Unfailing power for the hill climb—rough roads—heavy going. Strong and steady motor service all day—day after day.

It depends on the piston rings. Full power can only follow perfect compression—and such compression requires the use of

TRADE-MARK REGISTERED

PATENTED

Piston Rings

MADE BY McQUAY-NORRIS MFG. CO.

The only piston ring that is effectively gas-and-oil-proof, because of its sealed openings and the equal and sustained bearing it obtains on the cylinder.

The superior quality of the metal used in the LEAK-PROOF Ring—the strength and simplicity of its design—the careful testing it undergoes for flaws—the accuracy of its finish—these are the reasons why it is the most durable, economical and efficient piston ring. Made in all sizes—easily adjusted.

Send for Free Booklet—It tells all about piston rings and why you should equip your engine with the LEAK-PROOF. How it will pay you in fuel economy and prolonged motor life. Write for it.

"Ask the User"

In use on over 200,000 automobiles and motor boats.

Sold by all up-to-date garages, repair shops and marine stores.

MANUFACTURED BY

McQuay-Norris Mfg. Company

DEPARTMENT C.

2808-12 Locust Street **St. Louis, Mo.**

BRANCH OFFICES:

NEW YORK, 1919-29 Broadway, at 64th St.
PITTSBURGH, 7620 Tioga St.
KANSAS CITY, MO., 513 New Nelson Bldg.
CHICAGO, Suite 718 Michigan Blvd. Bldg., Michigan Ave. and Washington St.
SAN FRANCISCO, 164 Hansford Bldg.
LOS ANGELES, 224 Central Bldg.
CANADA, W. H. Banfield & Sons, 120 Adelaide St., W., Toronto.

1-A

Look for the name LEAK-PROOF stamped on the Ring

The Men Who Have Owned Trucks for Years Buy United States Motor Truck Tires.

The motor truck's principal claim for preference over horse-drawn vehicles is its ability to save time.

United States Motor Truck Tires are known as long mileage tires, but one of their principal virtues is the speed with which they can be changed.

United States Motor Truck Tires

Truck owners appreciate the demountable feature of **United States Motor Truck Tires,** and for this reason the men who have had the longest experience in motor truck delivery always buy trucks equipped with **United States Motor Truck Tires.**

United States Tire Company
New York City

HERZ PLUG

HERZ & CO., 245 W. 55TH St. (Near B'way) N.Y.C.

REG. U. S. PAT. OFFICE

High-Tension Magnetos

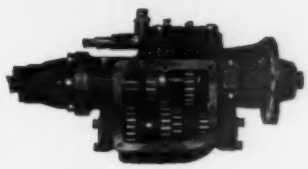
for *Fords*—pleasure and commercial—are revolutionizing the running of thousands of these remarkable machines. If you want **real** *Ford* efficiency, write for our free booklet, "Ford Power Possibilities."

SPLITDORF ELECTRICAL COMPANY

ATLANTA	10-12 E. Harris St.	LOS ANGELES	1215 S. Hope St.
BOSTON	St. Germain and Mass. Ave.	MINNEAPOLIS	34 S. 8th St.
CHICAGO	64-72 E. 14th St.	NEWARK	290 Halsey St.
CINCINNATI	811 Race St.	NEW YORK	18-20 W. 63d St.
DALLAS	402 S. Ervay St.	PHILADELPHIA	210-212 N. 13th St.
DAYTON	427 E. 3d st.	SAN FRANCISCO	1028 Geary St.
DETROIT	972 Woodward Ave.	SEATTLE	1628 Broadway
KANSAS CITY	1827 Grand Ave.	TORONTO	469 Yonge St.
LONDON		BUENOS AIRES	

COVERT COVERT COVERT

TRANSMISSIONS



Of the Highest Quality

Covert Transmissions are the result of many years' successful transmission building—today they are recognized as the best—not only in point of service and durability but also in regard to quietness and all-around efficiency.

Made in various models for different sizes and types of cars—Covert Transmissions will free you from transmission troubles. Let us show you how they fit your construction.

Covert Motor Vehicle Co.

SALES OFFICE	FACTORY
Detroit, Mich.	Lockport, N. Y.

Adams Trucks
"Deliver the Goods"

1, 1½ and 2 TON

CONTINENTAL MOTORS EXCLUSIVELY
TIMKEN AXLES AND BEARINGS THROUGHOUT
BODIES BUILT FOR ANY TRADE

PRINTED MATTER
SENT ON REQUEST

AGENCY PROPOSITION TO RESPONSIBLE DEALERS

THE ADAMS BROS. COMPANY
FINDLAY, OHIO, U. S. A.

FIRST AMERICAN TRUCK MANUFACTURERS TO USE FRENCH TYPE HOOD, WITH RADIATOR AT REAR OF MOTOR

ROSS
STEERING and DIFFERENTIAL
GEARS
are standard on good motor truck construction

WRITE FOR CATALOG

ROSS GEAR & TOOL CO.
790 Heath St. :: Lafayette, Ind.

ROWE
MOTOR TRUCKS

are used in every line of business and in every case have proved the most economical means of hauling.

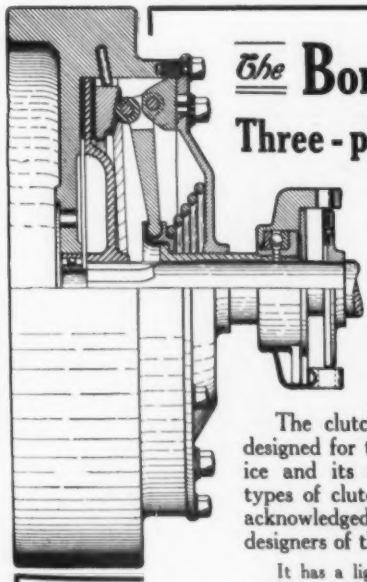
A Rowe Truck will save you money in transporting your merchandise.

The Rowe Truck is guaranteed to give

Continuous Economical Operation

Worm or chain drive. One to five tons capacity

Rowe Motor Manufacturing Co.
Downingtown, Pa.



The Borg & Beck
Three-plate dry disc
Clutch
offers a real solution of the clutch problem

The clutch has been especially designed for truck and tractor service and its superiority over other types of clutch now in use is freely acknowledged by engineers and designers of the highest standing.

It has a light friction disc that will not manifest any drag in releasing. Its engagement is gradual and positive, and it will not grab, stutter or slip. Does away with gear shifting in crowded traffic by means of friction-slippage. Can be slipped indefinitely without damage.

Truck, tractor and automobile makers are invited to write for complete description.

The Borg & Beck Co.
Moline, Ill.

BORG & BECK MOLINE, ILL.

HESS-BRIGHT

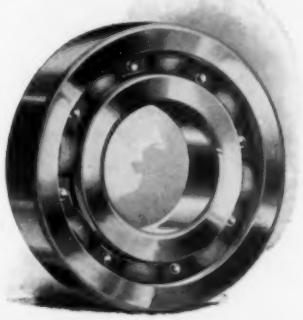
HB DWF

Ball Bearings

The validity of HESS-BRIGHT patents has been upheld by the courts of the nation. The superiority of HESS-BRIGHT BEARINGS has been affirmed by the court of public opinion.

The Hess-Bright Mfg. Co.

Front St. & Erie Ave., Philadelphia, Pa.



Stegeman

MANUFACTURING POLICY

Our idea in building trucks is not to build the most—(QUANTITY)—our idea is to get *permanent* satisfied customers and *users*, and there is only one *absolute* way of doing this—

USE THE WORLD'S BEST UNITS—

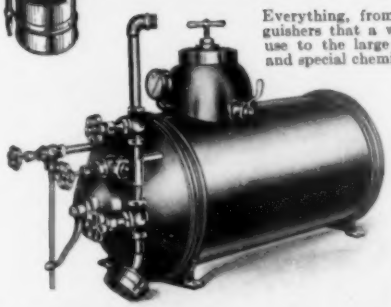
(Not second best or something nearly as good.) We use Continental motors, Brown-Lipe nickel-steel gears throughout in both transmission and differential, Timken bearings, Eisemann automatic advance magnetos, mangano-silicon springs, chrome-vanadium axle forgings, nickel steel in all bolts and pins plus "STEGEMAN" simplicity and 10 special features of design—each one of which has proved in practice an item of maintenance economy.

Our Users from Coast to Coast are the Country's largest and most prominent buyers.

Write us and have our literature for reference

STEGEMAN MOTOR CAR CO., Milwaukee, Wis.

DEPENDABLE Chemical Fire-Fighting APPARATUS



Everything, from the hand extinguishers that a woman or child can use to the large Chemical Engines and special chemical tanks for Fire Department service.

Into each is put material and workmanship that cannot be excelled. Designs are shown by actual use to be beyond improvement.

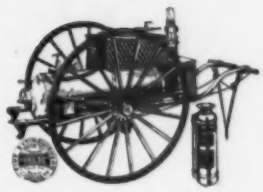
Result: Perfect and immediate action when needed, no deterioration from lack of use or age.

All Our Tanks Are Made of Copper

The name **"CHILDS"** stands for perfection.

Chemical Tanks for Fire Department or other service made to order.

Write for our Complete Catalogue and interesting talk on Fire Apparatus.



O. J. CHILDS CO., Utica, N. Y.

MANUFACTURERS FIRE APPARATUS

ON THE JOB EVERY DAY

Day in and day out the year round your truck must be ready to do its work and do it at the least possible expense.

Selden Trucks

have invariably given this kind of daily service to their owners because they are built to stand the strain of continuous work. Every working part to the last bolt is larger and stronger than corresponding parts of any other 3000-lb. truck. We invite comparison.

$500 Puts the $2000 Selden Truck into Service

The balance may be paid at the rate of $125 per month. The Selden Sales Plan as indicated above has proven very satisfactory to users and dealers alike. It will pay you to investigate the true merit of the Selden Truck and the plan by which it is sold.

SELDEN TRUCK SALES CO.

410 East Ave.
Rochester, N. Y.

Which Truck Is Best of the Famous Big Four?

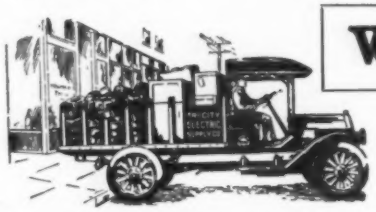
Experienced buyers of motor trucks now choose between four great makes. Each of the four is backed by millions. All are in the business to stay. Among them competition is keen. Almost daily, keenly competitive tests between these four great makes of trucks are establishing which is the best. For all are in use by the largest corporations—who use trucks by the dozen.

In pulling power the Velie Truck, the only one of the big four unadvertised until now, proves that a more powerful, slower running motor will in competitive tests out-pull and out-wear all high-speed, small-powered motors.

In three-ton trucks all four makes have 5 or 6 inch frames—channel shaped, or I-beam. But the Velie in addition to having a 6-inch I-beam frame has a 4-inch sub-frame. And in heavy hauling this extra sub-frame proves its wonderful worth.

Experienced buyers can tell by comparison of specifications why it is that the Velie is winning the fiercely competitive tests between the four best makes of trucks.

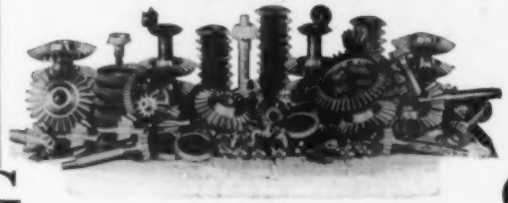
Any Velie agent has these truck contest results on file—they are convincing—ask to see them.



Velie

Velie Motor Vehicle Company - Moline, Ill.

GEARS



GEARS GEARS

Bevels Mitres Worms
Spurs Spirals Racks
Sprockets

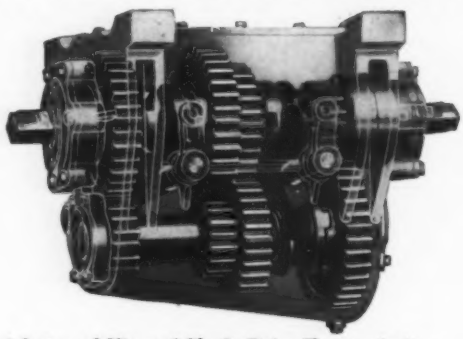
We produce in quantities to specification cut and planed Gears and Pinions of all descriptions. As a source of supply in connection with *Gears* and *Gear Cutting*, we are considered an asset by many of the best interests. They buy from us year after year, because these advantages are afforded:

(1) *Unexcelled facilities.*
(2) *The highest standard of workmanship.*
(3) *Years of experience as specialists in gearing.*
(4) *A most careful selection of materials.*
(5) *Particular attention to deliveries.*

THE VAN DORN & DUTTON CO.
Gear Specialists
CLEVELAND (Sixth City)

GEARS

COTTA TRANSMISSIONS



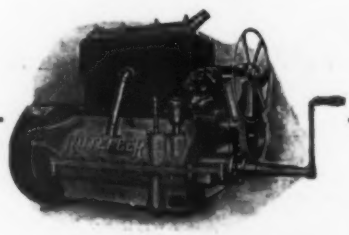
Internal View of Shaft-Drive Transmission, designed for use in worm-drive trucks

For Heavy Truck and Tractor Service
Eliminate Transmission Trouble

Selective type, individual clutch system. All gears always in mesh. Countershaft and mainshaft gears idle on direct. Improved speed-changing device. No plain bearings —loose gears mounted on roller bearings.

Write for Bulletin

COTTA TRANSMISSION CO.
814 So. Main Street Rockford, Illinois



Power for Every Purpose

Maximum Power, Speed and Endurance with Minimum Cost for upkeep and operation. Extreme Simplicity with Unequaled Efficiency. Perfect Balance. Long Life. You get all these advantages when you equip your commercial cars or pleasure cars with

THE RUTENBER MOTOR

Fours and Sixes suited to the requirements of all kinds of motor-driven vehicles. Standard or Unit Types. All L-Head, Four Cycle. The Rutenber Motor practically guarantees a ready sale for the car or truck that carries it.

We invite manufacturers to investigate our motors and our facilities for giving service. Literature on request.

The Rutenber Motor Company
Marion - - Indiana

HINDLEY
Worm-Gear Axle

The drive that makes a truck really efficient and profitable

The embodiment of this drive in a truck assures longer service, greater efficiency, less expense, lower operating cost.

This is not merely theory, but facts proved by experience. So firmly established have become the advantages of the Hindley Worm-Gear Axle that its presence in a truck is both an assurance of its worth and an argument for its sale.

It is to your interest to inquire about this drive for the trucks you build. The services of our engineering department are at your command.

HINDLEY GEAR COMPANY
1105 Frankford Avenue Philadelphia

Part of Fleet of 11 Stewarts in the Service of the Buffalo News

Stewart
Delivery Trucks

Learn About This New Model

The New Stewart at $1500 is ahead of any other light delivery truck on the market —with 500 less parts than any other of its type, greater simplicity, greater fool-proofness, and greater economy in tires and fuel consumption.

Write for information about the New Stewart, and details about our New Policy for Dealers.

Stewart Motor Corporation. Buffalo. N.Y.
T. R. Lippard, Pres. and Gen'l Mgr. R. O. Stewart, Vice-Pres. and Chf. Eng.
R. P. Lentz Sec. and Treas.

B-A-Gramm's Trucks

appeal to the man who has had experience in the use of motor trucks.

To him their quality points, the individual clutch transmission, guaranteed springs, self-starter, etc., mean a definite saving in operating costs.

The full line, 1 to 6 tons, with all its features, is described in our complete catalog, which will be sent you on request.

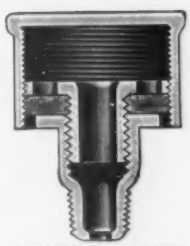
THE GRAMM-BERNSTEIN COMPANY
Dept. 1 LIMA, OHIO, U. S. A.

PLAIN COMPRESSION
(Patented)

Empress
BRASS AND STEEL
GREASE AND OIL CUPS

WE MANUFACTURE
a full line of Plain, Leather Packed, Ratchet, Marine, Spring Compression, and many other styles of Grease Cups.

Our line of Oil Cups is equally satisfactory and complete.



LEATHER PACKED
(Patented)

Catalogue on Application

Bowen Manufacturing Co.
AUBURN, N. Y.

"Dreadnought" Type Indestructible

By keeping track of your truck mileage, you can tell which tires give you the best service; and get better adjustments, too.

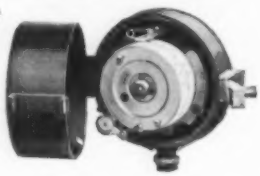
TRANSIMETER

(Hub Odometer)

enables you to keep accurate mileage records and save money in truck operation. Here are several special TRANSIMETER features:

1. Grease- and dust-proof; figures always legible.
2. Figures do not revolve—always right side up.
3. Steel pin connection between axle and mechanism.
4. "Dreadnought" Type guaranteed indestructible.
5. "Applied" Type attachable to any truck or car.

RECORDOGRAF



gives a tape record of

1. Time truck is moving.
2. Time truck is standing.
3. Distance truck covers.
4. Speed at various times.

Write for folder and prices.

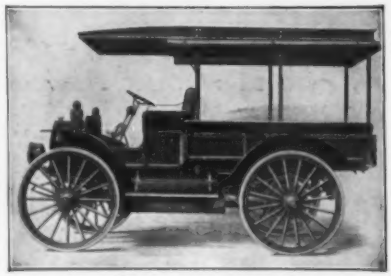
AGENTS: Accessory and tire salesmen can make a profit on these instruments.

AMERICAN TAXIMETER CO.

Mfrs. of Popp and Jones Taximeters

Seventh Avenue at 49th St. New York City

Will It Last?



"We know your truck will do our work—for a time. But how long will it last? Is it true economy to buy International Motor Trucks?"

The facts show that it is true economy. Some of our trucks are still doing good work after eight years of steady service. There is one in Boston which has traveled more than 100,000 miles, another in Chicago which is just rounding out its hundredth century, and there are hundreds more

International Motor Trucks

approaching the "cent per hundred miles of service" mark.

Bear in mind that no truck—no matter how well built—is any better than its driver. Give an International Motor Truck the care that any machine must have and it will last long enough in your service to pay for itself over and over again.

Write us for full information about this efficient, economical, quick delivery motor truck—a money saver and a money maker for any business man who can use it. Address your card or letter

International Harvester Company of America

(Incorporated)

182 Harvester Building CHICAGO U S A

Flint

1600-2000 Lbs. Capacity

Another Satisfied User

C. E. Brandt & Company, Wholesale Paper and Twine Dealers, Flint, Mich., writes: "Because of the service your 'Flint' Truck has been giving us, we feel you should know how well we are pleased. It is doing the work of two horse-drawn vehicles, sometimes three. In service six days a week without any trouble. Loads run from 1200 to 2000 pounds. Averages 12 miles to gallon gasoline, and 100 miles to gallon oil."

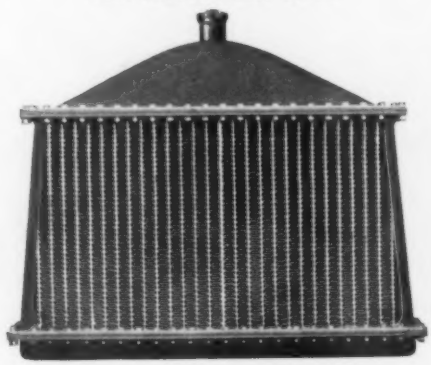
This is the sort of service that is built into all "Flint" Trucks. They satisfy both user and dealer.

FLINT MOTOR WAGON DEPARTMENT

DURANT-DORT CARRIAGE COMPANY, FLINT, MICH.

CANDLER TRUCK RADIATORS

Cast Demountable Tanks



Unusual Strength—High Efficiency

The Candler Special Truck Radiator is the strongest construction on the market to-day. It is highly adapted to truck use, by virtue of its efficiency, strength and durability, non-leakable and non-freezable features as well as its ease of repair.

We invite correspondence from those interested in a Practical and Serviceable Truck Radiator.

CANDLER RADIATOR COMPANY

DETROIT, MICH.

Delivering Service—

This up-to-date Goodrich Service Station is located at 605-609 West 48th Street, New York, between Eleventh and Twelfth Avenues. The station is accessible to the railroad and ferry terminals, where much heavy trucking is done. It is fully equipped with

GOODRICH
WIRELESS
TRUCK TIRES

and complete facilities for the proper and speedy application of both Demountable and Pressed-On Types. For expert truck tire service, Phone Columbus 8700.

What the Goodrich New York Service Station is doing for other New Yorkers, it will do for you.

THE B. F. GOODRICH COMPANY
Factories: AKRON, OHIO

Send today for "Motor Trucks of America"

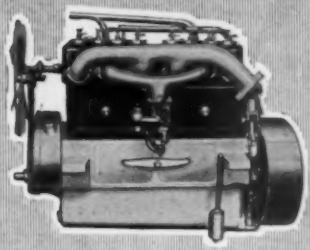
Branches in all Principal Cities

THE Waukesha Long Stroke Truck Motor is constructed to fulfill every obligation of the truck manufacturer to the purchasers of his trucks. It gives the purchaser what he expects—and what he pays for—namely: *efficiency, reliability, dependability, workability.* Its immense capacity for hard work and hard knocks is due to design and construction of unusual merits.

Like Uncle Sam's war-dogs, the Waukesha is built to *resist* the forces of destruction.

WAUKESHA

4¼×6¾" LONG STROKE TRUCK MOTOR



Strength of construction is not the Waukesha's sole merit. It has the remarkable fuel economy of ½ of a pint of gasoline per horse power per hour. It's a motor with unlimited strong selling features for your truck—because it makes good every promise your guarantee contains.

We'll be glad to send detailed information on request.
WAUKESHA MOTOR CO., Dept. A, Waukesha, Wisconsin

PACKARD TRUCKS CUT COSTS AND INCREASE YOUR BUSINESS

EXPRESS and transfer business demands a motor truck that will adapt itself to a wide range of hauling conditions.

In eighty-five American cities, Packard trucks have proved their fitness for this exacting service.

A transferman's profits increase directly with his ability to take advantage of his opportunities. To him time is money lost or earned.

Today more than ever before the Packard is a profit builder. Horseflesh and horse maintenance continue to advance in cost. Packard trucks reduce your costs and at the same time expand the radius of your service.

One hundred and fifty-five successful express and transfer firms are operating three hundred and seventy-two Packard motor trucks.

ASK THE MAN WHO OWNS ONE

PACKARD MOTOR CAR COMPANY
DETROIT

Licensed Under Kardo Patents Lincoln Highway Contributor

Feed The Truck
Clean Oil and Vitalized "Gas"

The dray horse that was fed plenty of good, clean oats did the best work. The commercial car fed on good, clean, Bowserized gasolene is the car that "delivers the goods" day in and day out. No car out of commission through poor "gas". No delays on steep grades through gasolene that "lacks the punch".

CUT No. 41. Long Distance Self-measuring Gasolene Pump

BOWSER Underground Gasolene Storage Systems

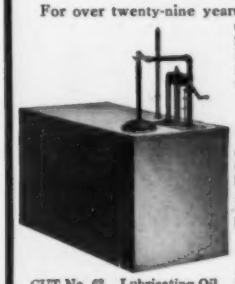
Here the gasolene is kept sweet and clean and at about a constant temperature. No evaporation, no danger from cigar ashes or steel shod feet. Can't evaporate, can't lose its "kick". Every drop used. Every drop piped any distance to the garage. Measured and checked. You see the difference in added mileage, in the maintained efficiency of the car. Also

Bowser Lubricating Oil Storage Systems

Keep all the "velvet" in lubricating oil. Keep dirt from getting in the bearings, no loss in handling, no mussy floors. Every drop automatically measured and accounted for. Safety—economy—efficiency.

The Great Bowser Idea

For over twenty-nine years Bowser has been solving oil storage problems of all kinds, from Garages and Stores to million dollar Power Plants. Bowser can help you solve your garage problem. Write for illustrated literature today—NOW.



CUT No. 63. Lubricating Oil Self-measuring Outfit

To Dealers

We can now make dealers an attractive proposition to handle our Private Garage Line. No stock required—direct shipments. Write today for details.

S. F. Bowser & Co., Inc.
Engineers, Manufacturers and Original Patentees of Oil Handling Devices
219 Thomas Street Fort Wayne, Indiana
Canadian Factory, 324 Fraser Ave., Toronto, Ont.

LONG

Cooling Systems

The very fact that a truck is equipped with a Long Cooling System is an indication of a well-made, dependable truck throughout. Long Cooling Systems are something more than radiators, they are systems designed especially to cool the motors with which they are used.

Over sixty-two manufacturers of high-class cars, aiming to keep up a high Standard of Efficiency and dependability throughout, are using Long Cooling Systems as regular equipment.

Long Cooling Systems are guaranteed to cool the motors for which they are designed. Long Cooling Systems are guaranteed to be free from defects.

Besides the Spiral Tube type, the most rigid, durable and dependable types for heavy trucks are the Cellular, Flat Tube, Honeycomb and Fin and Tube Types.

Write for catalogue describing the different types, methods of manufacture, and terms. Let us send an expert to solve your cooling problems.

LONG MANUFACTURING CO., Detroit, Mich., U. S. A.

"Pioneer Makers of Gasoline Engine Cooling Systems"

3 Pierce-Arrow Trucks Haul 150 Tons of Ice a Day

The Standard Ice Manufacturing Company of Philadelphia operates three 5-Ton Pierce-Arrow Motor Trucks, each hauling 50 tons of ice per day on runs that average three miles out from the manufacturing plant to the distributing stations.

The J. M. Horton Ice Cream Company has obtained equally satisfactory results from its fleet of six Pierce-Arrows operating in the congested traffic of New York City.

Pierce-Arrows are carrying ice in Florida, in Massachusetts, in Missouri, in Illinois and many other parts of the country, and everywhere, under widely varied conditions of climate, traffic and routing, they have proved themselves the quickest, cleanest, most economical and satisfactory means of hauling and delivering ice.

Pierce-Arrow Motor Trucks are manufactured in two capacities, 5-Ton and 2-Ton.

A request on your letterhead will bring an illustrated book giving full information on Pierce-Arrow Trucks.

PIERCE-ARROW MOTOR CAR CO.
BUFFALO, N. Y.

PREVENTS NOISY GEARS

ELIMINATES LEAKY GEAR CASES

THE WORD FOR MOTOR TRUCK GEAR LUBRICATION
SPEDOLENE
SPEDOLENE

SPEDOLENE

Is Revolutionizing Motor Truck Gear Lubrication

Where the pressure on axles and bearings is greatest—as with heavy pleasure cars and loaded trucks—the superiority of **SPEDOLENE** is best demonstrated. This wonderful gearing lubricant accomplishes what no other oil, grease or compound has ever been able to do.

"Let Your Truck be the Judge"

Remember, **SPEDOLENE** is purely a mineral lubricant and does not contain any grease, fat, lye, soda, acid or water, or anything injurious to the finest metal.

GRADE "SS" for gears in heavy pleasure cars and motor trucks.
GRADE "S" for gears in automobiles.

SOLD BY LEADING DEALERS EVERYWHERE

CONTINENTAL ASBESTOS CORPORATION
Manufacturers of Asbestos Lubricants, etc.; Spedolene, Journolene, Asbestolene, Cupolene, Axolene and Gearolene
WORCESTER, MASS., U. S. A.

Baker Electric Trucks

These eight points of BAKER superiority appeal to any user of motor trucks:

Double Brakes: Afford extra safety in controlling heavy loads on hills. Joints bronze bushed; shoes asbestos lined.

300% Overload Capacity Motor: Won't burn out. Extra wide driving chain runs with oil bath, in cast aluminum box.

Extra Equipment Included: Volt ammeter or ampere hour meter, hub or dash odometer, electric bell or horn, without charge.

Locked-Spoke Wheels: Strength saves breaks in skidding. Tires all extra size.

Pressed-Steel Chassis Frame: Light and strong; standard touring car construction of heavier weight.

Control Lever Just Under Steering Wheel: Enables driver to keep both hands on wheel all the time.

Springs Extra Tough: Will not break or crack; designed for 50% overload. Spring end and bracket bronze bushed.

Front and Rear Axles: Unusually strong tough steel drop forgings. Spring supports forged to axle.

The Baker Motor Vehicle Company
CLEVELAND

Answers Many Questions of Economical Maintenance

Questions that confront every truck owner; such as fuel costs, tire costs, how the truck is standing up, whether the driver is to be depended upon, and so forth—all are answered with positiveness by the

JONES HUB ODOMETER

A mileage recorder that is a ***real*** authority. Cannot be made to lie because it registers backward as well as forward wheel travel. Cannot be tampered with because it is permanently sealed when attached. Absolutely accurate mileage registration and simple construction that bars the possibility of its ever running wrong. Its readings are generally accepted as irrefutable.

The Jones Hub Odometer replaces the regular hub cap and is supplied for all standard makes of motor trucks. In ordering, specify make of truck, year built, model number or letter, also wheel diameter and, if possible, actual wheel travel through one revolution.

Price, $20.00 ***Write for booklet***

Brake Lining that L-A-S-T-S

—not only insuring **safety** at every stage of its service, but **economy**, through fewer replacements. Ask for it by name

J-M Non-Burn Brake Lining

Made from pure, long-fibre Canadian Asbestos, woven tight, strong and uniform and reinforced with brass wire. Rendered impervious to water, oil and gasoline, by thorough impregnation. Does not contain a particle of perishable material. Will not char, burn, pull out or buckle. Is at once the safest and most economical brake lining you can buy. Sold by the best garages and dealers. Write for "Practical Pointers on the Care of Automobile Brakes."

UNDER this emblem the purchaser of J-M Commercial Car Accessories receives a twofold assurance of satisfaction. First, the guarantee of a trustworthy firm over half a century old. And second, such efficiency of Service after sale as is made certain by Johns-Manville established Service Branches in every important city of North America.

Hotter Sparks *and* Longer Service

The two qualities that account for the great demand for the

J-M (Mezger) Soot-Proof SPARK PLUG

Insures an unfailingly regular, hot, healthy spark at all times and under all conditions.

Short-circuit is a practical impossibility with the J-M (Mezger) type of double-chamber construction.

Easily disassembled and positively gas-tight. Fitted with high-grade porcelain insulator that successfully resists extreme changes in temperature.

Look for the **open end** to identify the genuine.

Price, $1.00 ***Write for Booklet***

OTHER J-M ACCESSORIES FOR COMMERCIAL CARS

Long Horn
Carter Carburetor
J-M Dry Batteries
J-M Automobile Tape

Write nearest Branch for booklets

H·W·JOHNS-MANVILLE CO·

SERVICE BRANCHES

Akron	Birmingham	Cincinnati	Dayton	Galveston	Kansas City	Milwaukee	New York	Portland, Ore.	Salt Lake City	Toledo
Albany	Boston	Cleveland	Denver	Houghton	Los Angeles	Minneapolis	Omaha	Rochester	San Francisco	Washington
Atlanta	Buffalo	Columbus	Detroit	Houston	Louisville	Newark, N.J.	Philadelphia	St. Louis	Seattle	Wilkes-Barre
Baltimore	Chicago	Dallas	Duluth	Indianapolis	Memphis	New Orleans	Pittsburgh	St. Paul	Syracuse	Youngstown

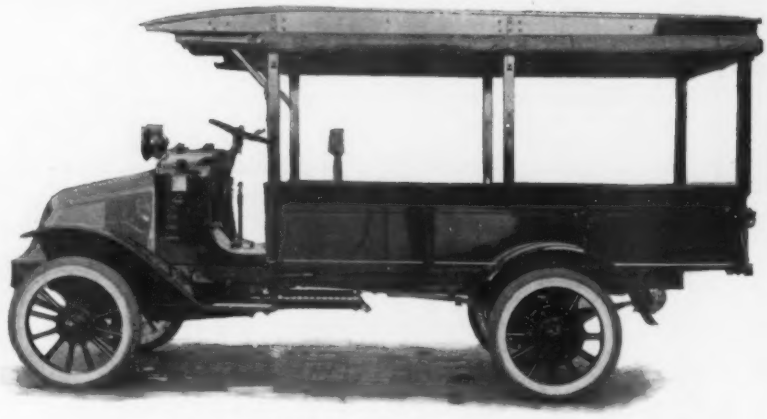
THE CANADIAN H. W. JOHNS-MANVILLE CO., Ltd., Toronto, Montreal, Winnipeg, Vancouver

2840

Sell the KREBS

---the only automatically governed worm-driven truck

That's a remarkably strong argument to advance—and one that goes a long way toward making the sale.



Model G, One-Ton Truck

The automatic governor means an economy of operation that appeals strongly to the prospective buyer. It leaves nothing to chance or to the intelligence and interest of the driver, but compels him to be an economical and efficient driver whether or not he wants to be. He simply steers while the governor runs the car, getting the maximum power from the minimum amount of fuel.

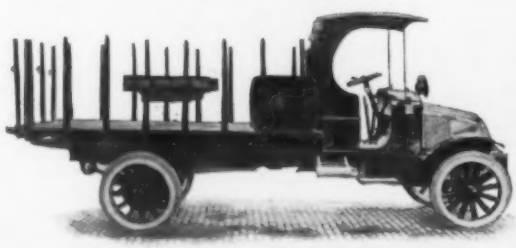
The worm drive means that the truck is silent in operation, is exceptionally powerful and marvelously durable, giving service that, in quality and length, is not possible with any other drive.

The KREBS has the famous Timken-David Brown Worm Drive mounted in a full floating rear axle—which means it has the very best procurable.

Without these features the KREBS is the equal in efficiency and value of any truck of its size built. With them, it is a superior product which you can sell because it offers more advantages than any truck your competitors can produce.

The KREBS is a money maker for dealers—let us submit the proof to you.

Model E, ½-Ton Truck



Model H, 2-Ton Truck

THE KREBS COMMERCIAL CAR COMPANY, Clyde, Ohio

SCHWARZ WHEELS

The Safest Wheels for Hilly Regions

Under favorable conditions ordinary wheels may give satisfactory service, only to fail under unusual demands.

Trucks that must operate in hilly regions, where bad roads and steep grades create exceptionally severe service conditions, need every ounce of wheel strength they can possibly secure. To have less is to invite disaster. The fancied economy of a cheap wheel will be wiped out many times by the loss caused by its failure and replacements.

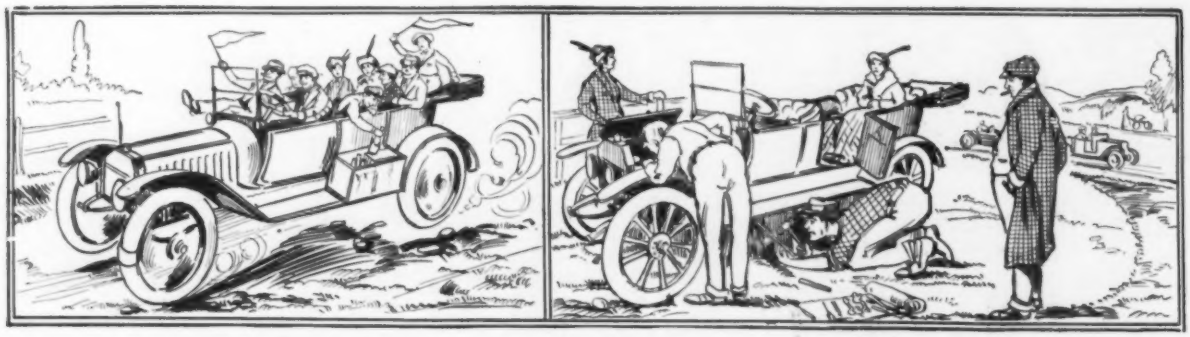
Any truck that is widely sold is bound to be used to a greater or less extent in hilly regions. The wise maker prepares for this by incorporating units which are equal to the most severe demands which bad conditions can impose. Among other things that means using SCHWARZ WHEELS.

The fact that SCHWARZ WHEELS are the safest and strongest made and the most economical in the long run has been so repeatedly and emphatically proved that it no longer need be argued. The voice of experience coming from engineers, designers and car and truck makers, offers conclusive proof.

If you are a maker of trucks, you need SCHWARZ WHEELS to protect its reputation in trying situations. If you are a user of trucks, you should insist on having SCHWARZ WHEELS, because they assure the maximum of safety for the truck and its load. The reasons why this is so are found in our booklet, "Bear the Burden"—send for a free copy.

The Schwarz Wheel Co.

Frankford Philadelphia Pennsylvania



BEFORE and AFTER

Mental pictures in the mind of the man about to buy a second-hand car.

Many a man buys his first car second-hand—then he buys his second car first-hand. His second-hand car gives him much valuable first-hand information about cars. If he had had this first-hand information first, before he bought his first car second-hand, he would have asked,—***"How about the wiring?"***

The best answer to that question is:

Packard

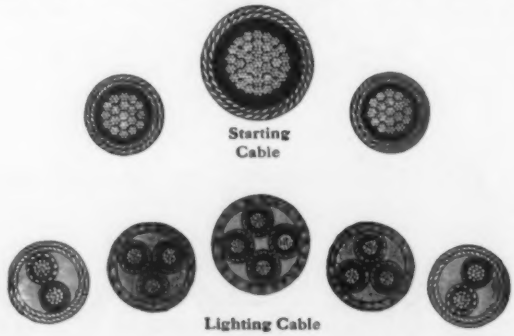
PROTECTED CABLE

While ***you*** own the car, ***Packard Protected Cable*** means dependable service—and you'll not have to rewire before the car can be sold second-hand.

The ***"protection"*** of this cable is not metal or fibre conduit, although these are sometimes used where the cable passes around sharp corners or through holes.

The ***"protection" is built into the cable*** and consists of a flexible ***enamel,***—applied to each conductor and to the completed cable. The rubber thus has its two braids ***plus*** a flexible covering which ***protects*** it against its worst enemies—oil and heat.

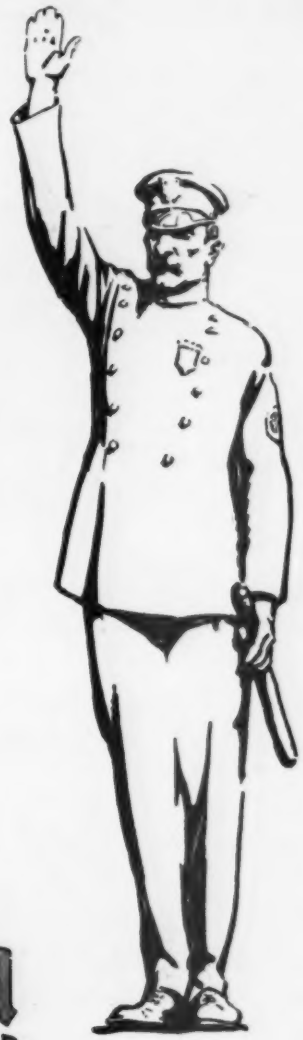
Packard Protected Cable on any car is a good proposition both ways—it makes the car easier to sell—and a better bargain for the man who buys it.



PACKARD ELECTRIC COMPANY, Dept. H, Warren, Ohio

(102)

When the Truck MUST Stop



No truck should have any less than 100% Brake Lining.

MR. MANUFACTURER: Those who buy your trucks are justified in demanding the utmost in brake protection.

You make sure that your trucks are soundly built; that they will stand punishment and strain—but have you seen that the brake lining is 100% dependable from first to last?

Thermoid
HYDRAULIC COMPRESSED
Brake Lining–100%

is dependable through and through. Its braking efficiency is 100% until it is worn down as thin as paper.

It cannot be burned out nor affected by oil, water, gasoline, or dirt.

Tests by the engineering departments of the leading automobile and truck manufacturers have placed Thermoid in the forefront of brake linings.

Our Guarantee—Thermoid will make good or we will.
Samples will be sent promptly on receipt of your request.

THERMOID RUBBER CO., Trenton, N. J.

Independent Light Delivery Trucks

Always on the Job

No Matter What the Job

Worm Drive

WORM DRIVE--The Ultimate Choice

The **Worm Drive** is the ultimate choice of wise buyers of motor trucks. Its life is practically without limit, giving service of 50,000 to 100,000 miles with no diminution in efficiency. It is absolutely silent, its parts are few and strong, it is completely enclosed and protected from dirt, it is easy to assemble, and it is the most efficient and dependable drive known for a truck of this class.

Tried and Proven Construction

Two years were spent in investigating the requirements of the light delivery field and perfecting the **Independent** Truck. It is designed by competent engineers, men who have specialized for years on delivery problems. Its construction has been thoroughly tested, and proven satisfactory in every detail. It sets a new standard for light delivery trucks, and it is unquestionably the leader in its class.

A WORM-DRIVE Truck for $1285 — and what is more, an **Independent!** This is the winning combination. Worm drive alone doesn't make a light delivery truck successful. Price alone doesn't make it attractive. But put the worm drive in a tried and tested construction which has been perfected and proven in every detail to be the most satisfactory possible, and sell this truck for $1285—then you have the most remarkable value in motor trucks, a value you can get only in the **Independent.**

An Exceptional Opportunity The light delivery field is a large and growing one. The market is practically unlimited. Light delivery trucks are used successfully by express and parcel deliveries, hardware and furniture dealers, milk depots, department stores, grocers, manufacturers, farmers, and practically every industry which delivers goods.

The **Independent** has no equal in strength and efficiency, and is practically without competition in its class. Dealers who handle it will find ready sales and exceptional profits. Our dealer's proposition is an attractive one. Send for full particulars and specifications.

PRICE, CHASSIS ONLY, $1285

We also build the Cass Model "E," 1½-Ton Truck, selling for $1850. Write for complete specifications

Independent Motors Company

Incorporated

Port Huron **Michigan**

The Edison-Equipped Electric Truck

is the Ultimate Solution of the most important problem now confronting the Warehouse and Storage Business—*i. e.* Transportation.

Why Edison Storage Batteries?

Because Edison Nickel-Iron-Alkaline Storage Batteries have the following advantages in this kind of service:

1.—They may be "boosted" at very high rates and charged sufficiently in a short time to meet emergency conditions.

2.—They are everlastingly on the job and require no expert attention in the garage or on the road.

3.—They may be left idle or worked for months on very small daily mileage without injury or extra care.

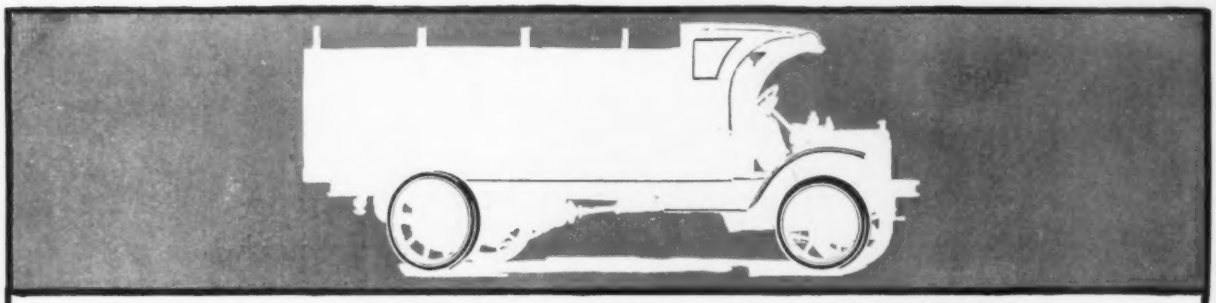
4.—They are guaranteed to be capable of developing ***100 per cent*** of rated capacity during ***four full years,*** thereby eliminating all risk on the purchaser's part that the profits of the road will be spent on repairs or renewals.

Economy *plus* Reliability *plus* Permanence

The Warehouse business is a fertile field for the Central Station and Electric Truck Manufacturer. We have a Co-operative Campaign we would like to discuss with you.

Edison Storage Battery Company

141 Lakeside Avenue - - - Orange, N. J.



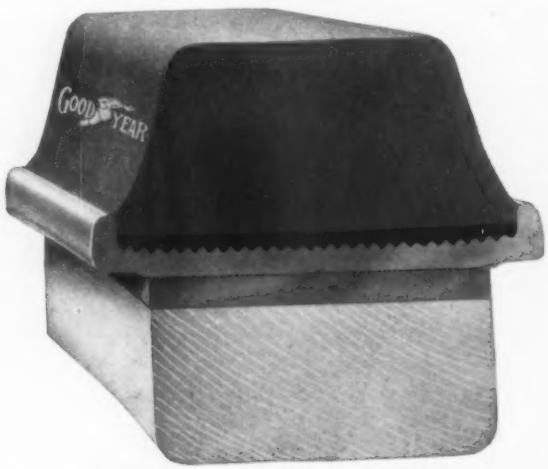
Our 1915 Truck Tire

No Bolts—No Wedges—No Flanges—No Bands

For fifteen years The Goodyear Tire & Rubber Company has been developing Truck Tires. For the last eight years this work has been principally on heavy service tires.

In this time, the men in our Experimental Department have solved a legion of tire problems. The work they are constantly doing to perfect Goodyear Tires costs us $100,000 a year.

This Goodyear Experimental Department has built 29 different types of Truck Tires. In the evolution of one type—the 1915 Goodyear S. V. Truck Tire—74 separate tire structures were built. Each was watched and tested for utmost efficiency.



In the last year and a half 2,100 test tires have been placed in actual use, under every working condition.

The result is the 1915 Goodyear S. V. Truck Tire. This 1915 tire marks today's finality in truck tire service, durability, simplicity, economy. It is the sum of all that has been done in the attainment of truck tire perfection.

Some New Features

The Goodyear S. V. is a metal-base tire of the pressed-on type. Wonderfully simple. No tire is applied more quickly, easily or securely. It cannot be applied wrong. There are no rights and lefts.

It is lighter than others—due to a total absence of cumbersome metal wedges, flanges, bolts and bands used to keep other tires in place.

It has a flat tread—which means better load-distribution, better traction and a uniform wearing quality.

The metal base is a corrugated channel, to which is vulcanized a layer of hard rubber. Then comes the tread rubber. By a Goodyear process, the metal, the hard rubber and the soft rubber tread are all welded together into one inseparable unit.

GOODYEAR
AKRON, OHIO
S. V. Truck Tires

Less Cost Per Tire-Mile

Ask us to show you how big concerns in every field are lowering tire-mile costs by using 1915 Goodyear S. V. Truck Tires. Learn also how these tires save equipment—the load—the driver's time —*how they keep the truck in commission.*

Before buying tires remember what Goodyear has done to insure the service and economy you seek. Goodyear S. V. Truck Tires eliminate guesswork and experimentation. Get Goodyear experience when you buy Truck Tires.

THE GOODYEAR TIRE & RUBBER COMPANY, AKRON, OHIO
Makers of Goodyear No-Rim-Cut Automobile Tires

(1965)

EISEMANN

Just as additional evidence of the continued supremacy of Eisemann Ignition, especially in the motor truck field, we cite the fact herewith that at the last count of the 83 concerns with whom we have contracts for standard equipment, 50 of them were contracts with motor truck manufacturers.

As we have often repeated, this simply bears out our contention, that where efficiency, dependability and durability count most, there you will find Eisemann most firmly entrenched.

In other words, Eisemann Magnetos are not only a sales asset, but to the manufacturer of motor trucks who must sell on a cost-of-service basis, Eisemann Magnetos are the biggest sort of service asset as well.

So far as the truck field is concerned, the assertion is truthfully made, that no instrument is so particularly adapted as the Eisemann Magneto with automatic spark control. By the very nature of its design and construction, the automatic spark control Eisemann Magneto means more mileage per gallon of gas and oil, and greatly increased life both of engine and car itself.

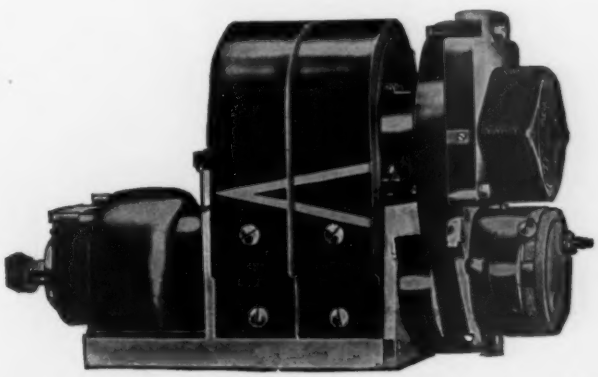
If you are not familiar with this particular type of Eisemann Magneto, the story will interest you. Won't you send for it?

Fifty Truck Makers Now Use Eisemann Ignition.

The Eisemann Magneto Co.

Sales and General Offices
32—33d St., Brooklyn, N.Y.

New York	Indianapolis, Ind.	Detroit, Mich.
123 W. 52d St.	514 N. Capitol Ave.	802 Woodward Ave



When Writing, Please Say—"Saw Your Ad. in the C C J"

Everyman's Delivery Problem Solver!

The TRUMBULL

Light Delivery Car

The Car of Universal Application

$395

The Trumbull is a delivery car that completely meets the requirements of retail delivery service for all kinds of establishments, ranging from great stores down to those firms who now have their goods delivered by expressman.

It has ample capacity for such work, is inexpensive in first cost, economical to operate, easy to handle and durable in service. It is ideal for providing quick delivery at low cost and extending a firm's radius of opertion without prohibitive expense. It's just the kind of car a small firm wants, and the kind that saves the big house money.

The Trumbull is a strong, sturdy, well-built delivery car. It has a silent and powerful four-cylinder, water-cooled motor, 2⅞ x 4, 14-18 H. P., large valves and bearings; 1½" crank shaft; high-tension magneto; pump and splash lubrication; cone clutch; I-beam front axle, ¾ floating rear axle; selective sliding gear transmission; transverse springs in front, cantilever in rear; wire wheels; pressed-steel frame; 80" wheelbase, 44" tread, 9" road clearance; speed, 3 to 50 m.p.h.; weight, 1050 lbs.; fuel consumption, 35 miles per gallon; standard equipment.

Both in materials and workmanship the construction is high class, and the car can be depended upon to give efficient, reliable, economical service. Every retail store that delivers goods can use the Trumbull with advantage and profit.

Territory Open for Aggressive Dealers

A great opportunity presents itself to live dealers, in the Trumbull agency. No matter where you are, there are scores—if not hundreds—of prospects in your territory. The price brings it within reach of all. The car will prove its value to any merchant, in any test. Convincing prospects will be easy, selling will be brisk, repeat orders plentiful, and profits correspondingly large. If you are after big money, tie up with this great success. Write today about your territory.

THE TRUMBULL MOTOR CAR CO., Bridgeport, Conn.

ONE OF OVER 300 G.V. ELECTRICS
IN THE EXPRESS BUSINESS.
AMERICAN EXPRESS COMPANY
GENERAL VEHICLE COMPANY, INC.
LONG ISLAND CITY, NEW YORK
NEW YORK—CHICAGO—BOSTON—PHILADELPHIA

SPEEDOGRAPH

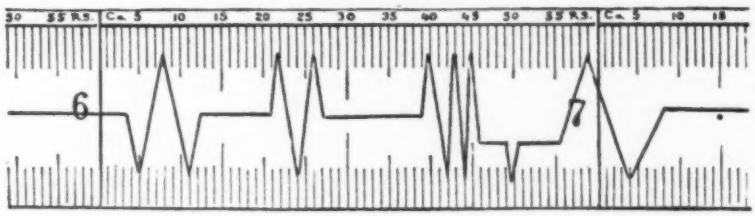
THE RELIABLE-TIME-DISTANCE-SPEED-RECORDER

A Necessity for the motor-vehicle owner who demands efficiency

← OPEN **THIS IS IT** CLOSED →

Manufactured by the Recording Speedometer Co., Newark, N. J.

Facsimile of a SPEEDOGRAPH Record



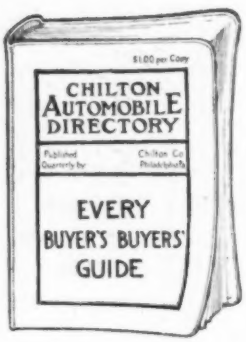
The tape is divided into hours and minutes, and the record line shows just what the truck was doing every minute of the day; the mileage, time, and speed of every run; and the time and duration of every stop.

You must have such information to obtain the greatest efficiency from your truck. The **Speedograph** gives it accurately, and repays its own cost many times over by the resultant saving of gasoline, oil, tires, repairs, etc. *Write for catalogue and prices.*

The Speedograph Sales Corporation *General Distributors* **No. 11 Broadway, New York**

THE BUYER'S TIME SAVER

that's what the busy purchasing agents call the



CHILTON AUTOMOBILE DIRECTORY

It tells them what they want to know about sources of supply for parts, tools, appliances and accessories and gives them the information when and as they want it. Every busy buyer should keep a copy at his right hand; for it will save him time and money. Most buyers do—if you are one of the few exceptions, place your order now for a copy of the

OCTOBER ISSUE---NOW ON SALE

After one experience with it you would not be without a copy at any price. Rarely, if ever, has so much valuable information been bound up in one volume, as you find here.

Bound in a flexible leather cover---price $1

Send now, before you forget it, your check, money order, or currency to the

CHILTON COMPANY, Market & 49th Sts., Philadelphia

The phosphor bronze coupler that seals the opening

BURD
PISTON RINGS

fit with a light, firm contact that is tight and carbon-proof at every point. They have proved their merit under every sort of condition. Try them. The results will surprise you. Write for free booklet **"Power", "Miles per Gallon" and "Piston Rings"**

BURD HIGH-COMPRESSION RING COMPANY
ROCKFORD, ILLINOIS

BALL Bearing Facts

Automobile manufacturers who have been using foreign makes of ball bearings need not worry over the war.

The New Departure plant is producing between ten and twelve thousand bearings per day, and this is not its maximum capacity. We can guarantee your specified deliveries not only now, but for any length of time in the future. We can also guarantee the quality of New Departure bearings to be the equal of any.

We solicit an opportunity to demonstrate to you our ability to completely meet your requirements now.

The New Departure Mfg. Co.
BRISTOL, CONNECTICUT
Western Branch, 1016-17 Ford Building, Detroit, Michigan

MAKING GOOD

18,583 Miles, and Still Running

This is the report, dated September 19th, on 2 36x5

E. C. McGraw Truck Tires

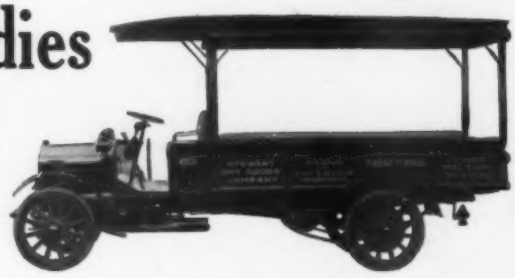
in service of the Fifth Avenue Coach Company of New Your City

Write for prices and particulars to

The McGraw Tire & Rubber Company
East Palestine, Ohio

Agents and dealers will receive best consideration

Highland Standard Bodies



The Automobile War is now going on.

European Nations are looking to American Manufacturers to supply Motor Trucks.

The use of Highland Standard Bodies makes it possible to quote promptly for quick delivery.

Send for Catalog No. 14, with price list.

THE HIGHLAND BODY MFG. CO., Cincinnati, Ohio

BUCKEYE Motor Truck Jacks

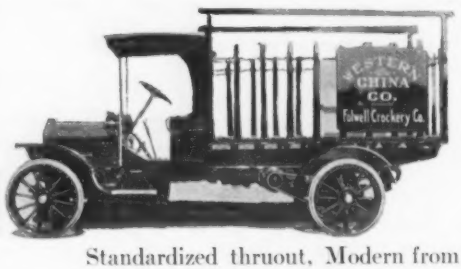
Buckeye Motor Truck Jacks are safe, reliable and made to stand the wear and tear for which they are intended. They are fully guaranteed, and cannot possibly drop with a load They are made from Steel Drop Forgings, best finish and workmanship throughout.

Get our prices before you place your orders for jacks, we can save you money.

No.	Height Bar Down	Raise of Bar	Height Bar Up	Weight	Capacity		List Price
7	11¼″	6½″	18″	16 lbs.	2½ tons	with formed handle	$10.00
13	14¼″	7½″	20¼″	26½ "	3 "		15.00
14	14¼″	7½″	20½″	33 "	5 "		16.00
9	11½″	6″	17½″	10 "	1½ "		6.00

Write today for descriptive catalog. Made only by

THE BUCKEYE JACK MFG. CO., Alliance, Ohio



DEALERS, ATTENTION!

MODERN

THE BOWLING GREEN MOTOR CAR COMPANY

TRUCKS FOR 1915

Standardized thruout. Modern from radiator to tail lamp, built in chain and worm-drive models. Just the truck to get the business in your territory. *Live dealers should write for catalog.*

THE BOWLING GREEN MOTOR TRUCK CO., Bowling Green, Ohio

The

NEVER-SKID

FOR MOTOR TRUCKS

PREVENTS SKIDDING *GIVES TRACTION*

Used by U. S. Government,
Brewers and Motor Truck Manufacturers throughout the U. S. and Canada

NEVER-SKID MANUFACTURING COMPANY
798 Tenth Avenue, New York

When Writing, Please Say—"Saw Your Ad. in the C C J"

Pyrene
TRADE MARK
FIRE EXTINGUISHER

The Pyrene Fire Extinguisher gives, not protection alone, but that which is equally important, the *constant feeling of security*. Aside from its efficiency when the fire does come, it repays its modest cost a hundred times a year in peace of mind besides securing for you *15% Reduction In Your Insurance Premium.* Ask that your new car be Pyrene equipped at the factory.

All leading Insurance Companies allow 15% reduction on the Fire Insurance Premium of *Pyrene-equipped motor cars* which reduction was originated by the Aetna Accident Liability Co. and the Automobile Insurance Co. of Hartford, Conn.

Pyrene Manufacturing Co., 1358 Broadway, New York

Brass and Nickel-plated Pyrene Fire Extinguishers are included in the lists of Approved Fire Appliances issued by the National Board of Fire Underwriters examined and labeled under the direction of the Underwriters Laboratories.

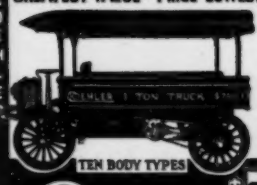
Aberdeen, S.D.	Boston	Chicago	Duluth	Nashville	Richmond
Alton	Bridgeport	Cincinnati	Fargo, N.D.	New Orleans	St. Louis
Anderson, S.C.	Buffalo	Cleveland	Jacksonville	Oklahoma City	St. Paul
Atlanta	Butte	Dayton	Louisville	Philadelphia	Salt Lake City
Baltimore	Charlotte, N.C.	Denver	Memphis	Phoenix	San Antonio
Birmingham	Charleston, W.Va.	Detroit	Milwaukee	Pittsburgh	York, Neb.

PACIFIC COAST DISTRIBUTORS:
Gorham Fire Apparatus Co., San Francisco, Los Angeles Seattle
DISTRIBUTORS FOR CANADA
May-Oatway Fire Alarms, Ltd., Winnipeg, Toronto
DISTRIBUTORS FOR GREAT BRITAIN AND THE CONTINENT
The Pyrene Co., Ltd., 19-21 Great Queen St., London, W. C.

DEALERS: OUR AGENTS ARE MAKING MONEY!

KOEHLER ONE TON TRUCK $750

GREATEST VALUE for the PRICE · LOWEST PRICE for CAPACITY



Here are brief specifications: MOTOR, 24 h.p., water-cooled, 4-cycle; IGNITION, high-tension magneto; TIRES, 36-inch, standard removable; TREAD, 58 inches; AXLES, 2-inch square rear, 1½ inch front; TRANSMISSION proved RIGHT by years of use. Gears, genuine chrome-nickel.

TEN BODY TYPES

KOEHLER $750 ONE TON TRUCK

THE REASON

SEND FOR CATALOGUE

DEALERS How about your city or town—is it Koehlerized, or waiting for someone to reap a harvest from sales? Will it be you, or one of your competitors who will make it hard for anyone else to sell any other make of truck? The Koehler is a great money-maker for dealers, being the lowest priced ton truck and giving greatest value at any price.

OUR TRAVELING REPRESENTATIVES ARE NOW COVERING THE ENTIRE COUNTRY and each has a truck with him. Notify us at once if you are interested as a representative may now be in your section. You do not want to miss a chance to see this truck.

Our complete catalog and selling plan should be in your hands—send for these.

H. J. KOEHLER S. G. CO., 1700 Broadway, New York

KOEHLER ONE TON TRUCK $750

WILL YOU LET US GIVE YOU THE PROOF? **DEALERS**

BESSEMER TRUCK

Illustration shows Model "C" which is equipped with either pneumatic or solid tires. There is more real sturdiness built into this than in any other one-ton truck on the market.

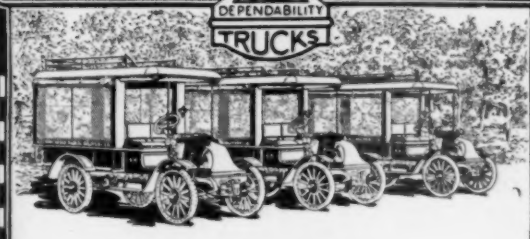
Three Models

MODEL C	MODEL A	MODEL D
1 Ton Capacity	1½ to 2 Ton Capacity	1½ to 2 Ton Capacity
25 H. P.—$1250	30 H. P.—$1800	Worm Drive
		30 H. P.—$2300

DEALERS: Write us about the special proposition we have for you. The Bessemer line enables you to handle every truck requirement.

BESSEMER MOTOR TRUCK CO.
GROVE CITY, PA.

PALMER SERVICE PM MOORE
DEPENDABILITY
TRUCKS



Good Will Pays

Good words from users constantly reach Palmer-Moore truck dealers. More than anything else this accounts for Palmer-Moore repeat orders as well as sales among new customers in the same neighborhood.

The Palmer-Moore differs from all other trucks, and in no way to a greater degree than in the fact that it is designed, developed and tested **always** with a view of running smoothly on solid tires.

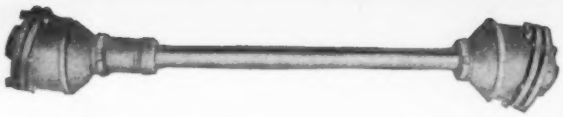
Service is built into the Palmer-Moore at the start, and it is there all the while, to the advantage of dealer as well as user.

1600 lbs. Capacity. All Bodies

Palmer-Moore Company

Dept. C SYRACUSE, N. Y.

Spicer Universal Joints



Universally Accepted as the Most Dependable Flexible Connection Known to Motor Car Practice

Oil-Tight Dust-Proof

PARTS INTERCHANGEABLE

Spicer Manufacturing Company
Plainfield, N. J.

Sales Representatives:
K. Franklin Peterson, 122 S. Michigan Blvd., Chicago
L. D. Bolton, 2215 Dime Savings Bank Bldg., Detroit
Foreign: Benjamin Whittaker, 21 State Street, New York

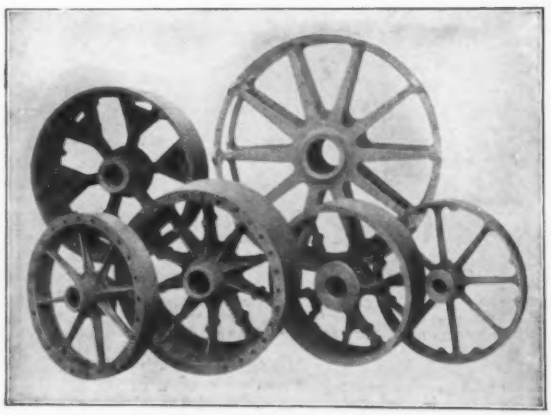
Steele's Speed Limit Control

prevents overspeeding of the Truck by automatically cutting out the ignition spark at any desired or predetermined point.

It does not interfere with the operator's control of the throttle.
Simple and absolutely dependable under all conditions.
SAVE YOUR TRUCKS by limiting the motor speed.
Full description and details upon request.

W. M. STEELE
98 BEACON STREET WORCESTER, MASS.

Cast Steel Wheels for Trucks



Any size or form to your specifications
25% saving on tires — 100% over wooden wheels

Our guarantee back of our wheels
5,000 wheels to date — no failures

Especially adapted for Army Service

Delivery in 6 days time after receiving order. Capacity 60 wheels per day

The West Steel Casting Co. CLEVELAND OHIO
Producers of Automobile Steel Castings

VIM LIGHT DELIVERY

The Car that Proved a Real Solution of Delivery Problems

Price, $635—Capacity, 1000 lbs.

A real commercial car—strong, rugged, durable—of oversize parts and high quality, at a price which makes it available for merchants of every character. Scores of dealers are finding it the money maker of their careers—it may be such for you. Write for information.

The Touraine Mfg. Company,
Main Office and Factory: Broad and Huntingdon Sts., Philadelphia, Pa.

Plant where Vim Cars are made

Capacity doubled to meet demand of 60 days

GEAR BRONZES

CRAMP

BEARING METALS

The best motor cars and trucks, those famed for their sturdiness and long service, boast the **CRAMP METALS.** The world's greatest battleships have spread the fame of **CRAMP METALS** world wide. The high standard of precision, accuracy and quality set in these battleships is not approached in any other engineering feats. Everywhere and every day **CRAMP METALS** become a part of some great commercial enterprise, simply because their quality is known. Why experiment? Specify—

"CRAMP BEARING METALS AND GEAR BRONZES"

The William Cramp & Sons Ship & Engine Building Company, Philadelphia, U. S. A.

The New 1915 1500 lb. Commerce

SHAFT DRIVE
CONTINENTAL MOTOR
CHOICE OF THREE BODIES

$975
COMPLETE

THE COMMERCE MOTOR CAR CO., 753 Penobscot Bldg., Detroit

"Exide" Batteries are used by the Largest Electric Vehicle Users

Let us tell you who they are

THE ELECTRIC STORAGE BATTERY CO.

PHILADELPHIA, PA.
1888-1914

New York Boston Chicago St. Louis Cleveland Atlanta Detroit Denver San Francisco Seattle Rochester Los Angeles Portland, Ore. Toronto

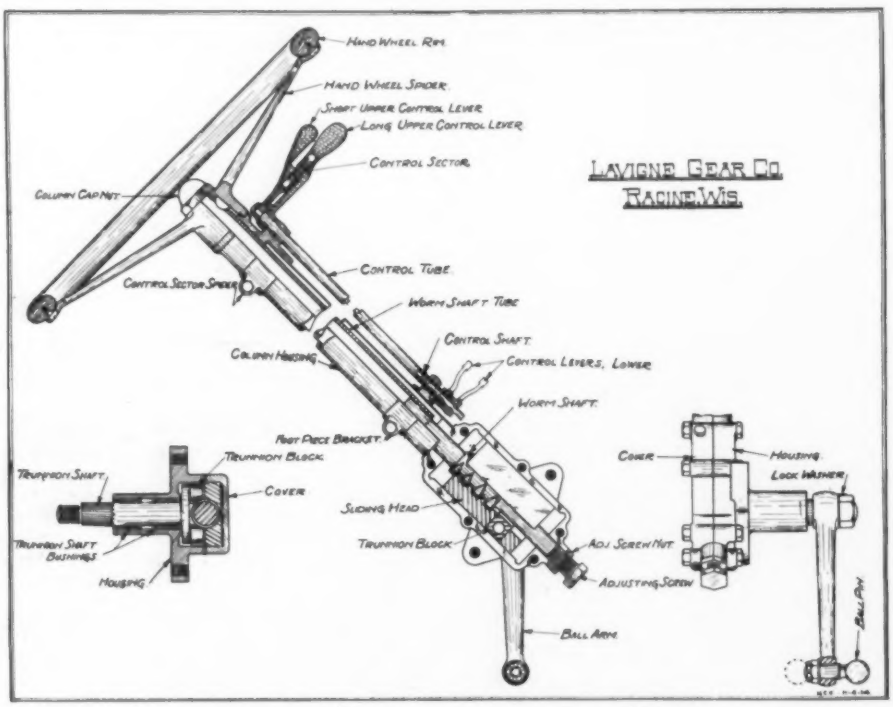
FRAMES

THE PARISH & BINGHAM CO.
CLEVELAND, OHIO

Our Entire Engineering Force is at Your Disposal

LAVIGNE
Steering Gears

Lavigne Gears are so standardized in construction that 48-hour shipments are always possible when conditions require ***quick service***



Sectional Illustration of Lavigne Truck Gear

Lavigne Gears are supplied in various models to meet ***any*** required service. All wearing parts of alloy steel, thoroughly heat and oil-treated, hardened and ground, and are the choice of many leading commercial car makers:

Jeffery Quad	**Republic Motor Truck Co.**	**KisselKar Trucks**
Atterbury Motor Truck Co.	**Universal Motor Truck Co.**	**Chase Motor Trucks**
"Menominee"	**"Indiana"**	**And many others.**

For dependability, efficiency, quality of product and complete thoroughness, Lavigne Gears are unexcelled. These points have made us the leader in production of steering gears for commercial cars.

Our gears are furnished with drag links.
We invite inquiries from responsible truck makers.

The Lavigne Gear Co. (Station A) Racine, Wis.

When Writing, Please Say—"Saw Your Ad. in the C C J"

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Wisconsin

CONSISTENT

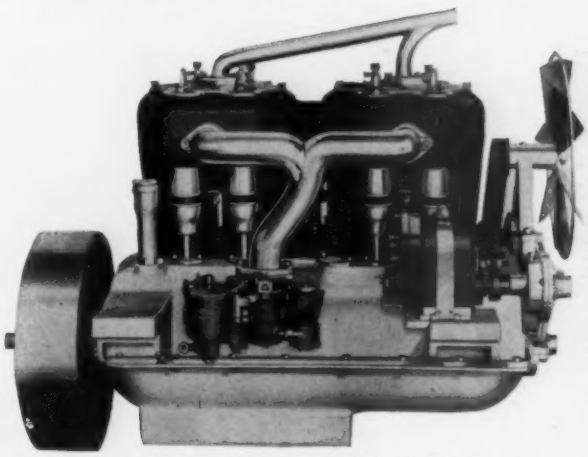
MOTORS

No type of motor, **unless specially built,** can withstand the continuous and grueling service of the motor truck.

The commercial car is at work **all** the time—in many cases day and night—and must, therefore, have a **consistent, dependable** and **durable** power plant.

The **Wisconsin** is specially **designed** and **built** for **motor truck service**—and judging from its continued popularity and ever-increasing demand by truck makers, users and dealers, it may be justly termed—

"The Consistent Truck Motor"



Wisconsin Type A—4¾" x 5½"

We invite inquiries from truck and tractor makers, who require the utmost in power and who build a truck in which is embodied the best obtainable parts and units.

Our new factory, of steel and concrete, covers over 90,000 square feet of floor space and it is devoted exclusively to the production of Wisconsin Motors.

Send for catalog, illustrating and describing the most complete line of gasoline motors in America.

Wisconsin Motor Mfg. Company

Milwaukee, Wisconsin, U. S. A.

The Truck for the Firing Line

One of a fleet of Quads owned by U.S. Army.
The Jeffery Quad is good on bad roads.
Jeffery Quad with load of hay climbing a 49 per cent grade.

TYPICAL VIEWS OF THE JEFFERY QUAD TRUCK — ARMY TYPE

THE ideal truck is simple, foolproof, reliable, a great hill climber and able to travel through rough country. The United States Army wanted such a truck, which should also be able to "go anywhere a four-mule team would go." So the Jeffery Quad was designed—the truck that

Drives, Brakes and Steers on All Four Wheels

The United States Army bought one, tested it severely, liked it and has been placing re-orders ever since.

THE Jeffery Quad is not by any means a freak truck. Thousands of Quads are in successful use all over the world. Hundreds of them are doing special work on the firing line in the great European war. The Quad combines all the work qualities of the rear-wheel-drive truck with the added advantage of being able to do the unusual when it is necessary—on hills; through mud, sand or snow; over roadless country; in fact, almost any place where traction can be had. One of the foremost authorities on motor wagons, witnessing a recent demonstration of the Jeffery Quad, said with conviction: "That is the ultimate truck."

SPECIAL features include: Automatic locking differentials that put the power into just the wheel or wheels that can get traction; fewer different parts than any other high-class truck; wheels, tires, axles, driving gears and other parts are duplicate and interchangeable; driving gears all enclosed, safe from dirt, dust and bullets; can run through 34 inches of water without flooding the carburetor; 15¼ inches clearance under the axles, 24 inches under transmission; all steel wheels, far stronger and lighter than wood wheels and less subject to damage from rough usage and bullet fire; wheel diameter invariable under temperature changes, thus avoiding tire troubles; equal distribution of weight on all four wheels; all four tires interchangeable; freedom from dangerous skidding; four speeds forward and one reverse; governed to a maximum speed of from 14 to 17 miles an hour; four-cylinder long-stroke high-efficiency Jeffery motor; 4000 pounds load carrying capacity.

Hauls Trailer Wagons, Artillery, Etc.

THE four-wheel-drive feature, combined with the two automatic locking differentials, make the Jeffery Quad an ideal tractor to haul trailers, artillery, etc., over rough roads and uneven country. The four-wheel-steer gives the Quad a short turning radius and causes the rear wheels to follow exactly in the tracks of the front wheels. The four-wheel-brake brings the truck to a stop in from 8 to 12 feet, from full speed, on a good road.

PRICE of chassis, with seat, tools and equipment, $2,750 f.o.b. Kenosha, Wisconsin, U. S. A. Boxed for export (chassis only), box measures 16 ft. 6 in. by 6 ft. 4 in. x 5 ft. 1 in., gross weight about 6800 pounds. Boxing, $50 extra. Freight rate, Kenosha to New York City, about $14.00 each, boxed, in carload lots (two trucks to a car). Vol. of box, about 531 cu. ft.

THE Thomas B. Jeffery Company is one of the oldest automobile manufacturers, has one of the largest and most modern truck factories and is equipped to furnish large quantities of Jeffery Quads at short notice—commercial models and all types of trucks for special army service.

Catalogs and special literature on application

The Thomas B. Jeffery Company

Main Office and Works, Kenosha, Wis., U. S. A.

Cable Address—Jeffcar, Kenosha

When Writing, Please Say—"Saw Your Ad. in the C C J"

R. P. SPENCER
Director of Sales

Spencer knows both the sales problems of the dealer and the needs of the user, from actual experience.

A. A. GEISEL
Eastern Manager

W. S. HILL
Central Manager

BENJ. RENNARD
Southern Manager

Introducing
The Field Force of the Denby

We want you dealers everywhere to get acquainted with the men who constitute the "firing line" of the Denby sales organization.

They're good chaps to know, all of them—including the ones whose photographs we haven't room for on this page.

And they are not the ordinary type of district manager—so called—who drops in, says "how-dy-do" and then "good-bye" leaving nothing to remember him by but a trail of more or less doubtful cigars.

These men are all real truck experts—men who have sold trucks themselves, who have studied haulage problems and who have a real message to bring to live dealers. For don't forget that "Denby trucks are sold ***through*** the dealer, not ***to*** the dealer."

So when the Denbyman who happens to be covering your territory reaches your town, give him the time he wants ungrudgingly.

For he's preaching the gospel of better truck profits; and his sermon is entirely free from the flamboyant piffle that has been too common in the truck business in the past.

Denby Motor Truck Company

22 Dubois Street **Detroit, Michigan**

C. T. CHENEVERT
Coast Manager

B. HAVENS
Coast Manager

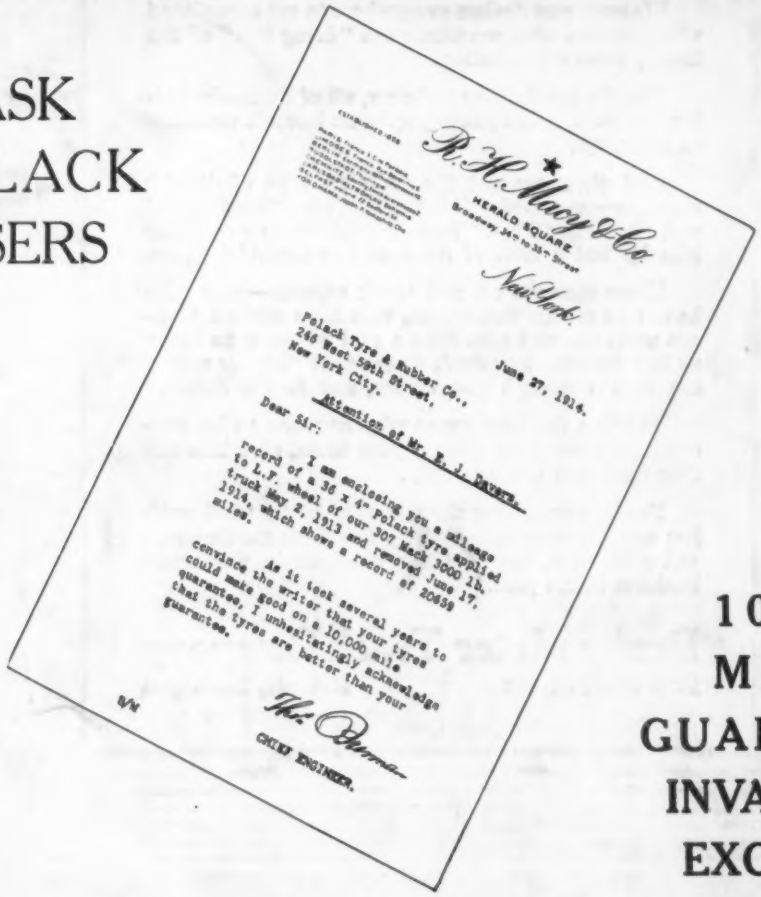
M. E. McKENNEY
Asst. to Director of Sales

DENBY

POLACK

INSURES TRUCK SERVICE

ASK
POLACK
USERS



R. H. Macy & Co.
HERALD SQUARE
Broadway, 34th to 35th Street
New York.

Polack Tyre & Rubber Co.,
246 West 59th Street,
New York City.

June 27, 1914.

Attention of Mr. F. J. Polack.

Dear Sir:

I am enclosing you a mileage record of a 36 x 4" Polack tyre applied to L.F. wheel of our 307 Mack 3000 lb. truck May 2, 1913 and removed June 17, 1914, which shows a record of 20639 miles.

As it took several years to convince the writer that your tyres could make good on a 10,000 mile guarantee, I unhesitatingly acknowledge that the tyres are better than your guarantee.

W/W

CHIEF ENGINEER.

10,000 MILES GUARANTEE INVARIABLY EXCEEDED

POLACK TYRE & RUBBER CO.

246 WEST 59TH STREET, NEW YORK.

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BOSTON
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